

# **Exhibit F**

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
OAKLAND DIVISION

IN RE APPLE IPHONE ANTITRUST  
LITIGATION

Civil Action No. 4:11-cv-06714-YGR

DONALD R. CAMERON, et al.

Civil Action No. 4:19-cv-03074-YGR

*Plaintiffs,*

v.

APPLE INC.,

*Defendant,*

**EXPERT REPORT AND DECLARATION OF LORIN M. HITT, PH.D.**

August 10, 2021

***CONFIDENTIAL DOCUMENT***  
***Lodged Pursuant to Local Rule 79-5(c)-(d)***

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## 1. QUALIFICATIONS

1. My name is Lorin Moultrie Hitt. I am the Zhang Jindong Professor of Operations, Information and Decisions at the University of Pennsylvania, Wharton School.

2. As a faculty member in the Operations, Information, and Decisions Department, my research and teaching focus on the economics of the information technology industry and related industries, with a specific emphasis on firms engaged in or affected by internet-based commerce. For instance, I have conducted research on pricing and competition among online travel agents, on the effect of product recommendation services on consumer choice and product price, on switching costs and customer loyalty to online brokers (and online businesses more broadly), on consumer behavior in online services such as banking and healthcare, and on the economic impact of social media services such as Facebook and Twitter. More broadly, my research encompasses both theoretical modeling and empirical analysis of pricing, marketing, competition, and consumer behavior in online markets.

3. I have published more than 35 peer-reviewed articles in top-tier economics and management journals such as the *Quarterly Journal of Economics*, the *Review of Economics and Statistics*, the *Journal of Economic Perspectives*, *Management Science*, and *Information Systems Research*, as well as more than two dozen other publications in books, trade journals, and other practice-oriented outlets. About a third of my published work in academic journals relates to pricing or consumer behavior, with most of the rest focusing on the economic value of information technology and factors that affect that value.

4. I previously held senior editorial positions at three major research journals: *Management Science* (former Department Editor), *Information Systems Research* (former Senior Editor), and *Journal of Management Information Systems* (Editorial Board member). I have also been a reviewer for the *American Economic Review*; the *Quarterly Journal of Economics*; *Information Economics and Policy*; *Journal of Industrial Economics*; *Journal of Law, Economics, and Organization*; *Managerial and Decision Economics*; *Marketing Science*; *Review of Economics and Statistics*; *Sloan Management Review*; and the National Science Foundation, among others. I have twice served on the program committee for the Workshop on Information Systems and Economics, the primary conference in my sub-discipline.

5. I have taught undergraduate, master's, doctoral, and executive education level courses at the University of Pennsylvania and the Massachusetts Institute of Technology on competition and customer pricing in a variety of commercial and consumer markets, information systems management, electronic commerce, information economics, data analysis, and methodologies used to understand the impact of information technology investments and strategies on firms,

consumers, and markets. I created one of the first courses on the economics of electronic commerce (first offered in 1998), which I taught for over 16 years. I continue to cover similar material in my Ph.D. seminar along with theoretical and empirical methods used in economic research and their application to the study of online markets including the markets for computers, smartphones, and software (including apps). I also designed the Wharton Undergraduate Managing Electronic Commerce concentration. I am a twelve-time award winner of the undergraduate excellence in teaching award, and I have also won the Wharton-wide Hauck Award and the University-wide Lindback Award for teaching.

6. I received my Ph.D. in Management from the Massachusetts Institute of Technology Sloan School of Management in 1996 and my Sc.B. (1988) and Sc.M. (1989) degrees in Electrical Engineering from Brown University. Before receiving my Ph.D., I worked as an engineer developing software and hardware for microprocessor testing (for Harry Diamond Laboratories, United States Army), as a researcher in semiconductor fabrication and design (for Brown University and the IBM Thomas J. Watson Research Center), and as a management consultant (for Oliver, Wyman and Company).

7. I have been retained as an expert witness on matters involving smartphones, tablets, laptops, other mobile devices, and personal computers as well as the underlying technologies within these products, such as microprocessors, LCD displays, memory devices, and communications chipsets. I have also worked on issues related to pricing and competition in a variety of software products including security software, database products, content creation software, and operating systems. Some of my more recent work has also addressed issues related to the value of information security and privacy on mobile devices and apps. I have been previously involved in antitrust litigation related to an alleged price-fixing conspiracy in LCD displays and the effects of such conspiracy on wholesale and retail prices<sup>1</sup> and an antitrust case against Microsoft in which I evaluated competition in operating systems and complementary products prior to and during the period when smartphones were first introduced.<sup>2</sup>

8. I was also retained by counsel for Apple in *Epic Games, Inc. v. Apple Inc.* (“*Epic v. Apple*”). I submitted two written reports in that matter as well as written direct testimony for trial. I was admitted as an expert and testified at trial in *Epic v. Apple* on May 12 and 13, 2021.

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<sup>1</sup> *In re: TFT-LCD (Flat Panel) Antitrust Litigation*, U.S. District Court, Northern District of California, September 1, 2016.

<sup>2</sup> *Prosys Consultants, Ltd and Neil Godfrey v. Microsoft Corporation and Microsoft Canada Co./Microsoft Canada CIE*, Supreme Court of British Columbia, Vancouver Registry No. L043175, 2013.

9. My Curriculum Vitae is attached as Appendix A, and a list of my testimony in the past five years is attached as Appendix B.

## **2. ASSIGNMENT**

10. I was asked by counsel for Apple to review and respond to opinions offered in the expert reports submitted by Plaintiffs' experts Professor Nicholas Economides, Professor Daniel McFadden, and Professor Einer Elhauge in which they assert that Plaintiffs can establish Apple's liability, determine impact, and calculate damages using common evidence and a common methodology for all proposed class members. I make this declaration in support of Apple's Opposition to Developer Plaintiffs' Motion for Class Certification; Apple's Opposition to Consumer Plaintiffs' Motion for Class Certification; Apple's Motion to Exclude the Testimony of Einer Elhauge, Nicholas Economides, and Christian Tregellis; and Apple's Motion to Exclude the Testimony of Daniel McFadden; and Apple's Motion to Compel Plaintiffs to Submit Trial Plan.

11. In reaching my conclusions, I have reviewed the data and materials produced in this litigation, academic literature, and other relevant publicly available materials. Appendix C lists the materials I relied upon in forming my opinions in the matter.

12. I am being compensated at my standard billing rate of \$950 per hour. I am being assisted in this matter by staff at Cornerstone Research, who are working under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my compensation in this matter nor my compensation from Cornerstone Research is in any way contingent or based on the content of my opinion or the outcome of this or any other matter.

13. My work on this matter is ongoing. The analysis and opinions in this declaration are based on the work I have done to date and the information that is available to me at this time. I reserve the right to revise or supplement my opinions as other relevant information becomes available or should Plaintiffs' experts provide new analyses or proposed methods not contained in their opening reports.

## **3. ALLEGATIONS**

14. This report relates to two proposed classes of customers of the Apple App Store ("App Store"): (i) the subset of consumers who have made paid transactions through the App Store and (ii) the subset of developers who have engaged in paid transactions through the App Store. The proposed consumer class consists of "All persons in the United States, exclusive

of Apple and its employees, agents and affiliates, and the Court and its employees, who purchased an iOS application or application license from Apple, or who made an in-app purchase, including, but not limited to, a subscription purchase, through such an application, for use on an iOS Device at any time from December 29, 2007 through the present.”<sup>3</sup> The proposed developer class consists of “[a]ll U.S. developers of any Apple iOS application or in-app product (including subscriptions) sold for a non-zero price via Apple’s iOS App Store at any time on or after June 4, 2015.”<sup>4</sup>

15. The consumer Plaintiffs allege that “Apple has engaged in an anticompetitive scheme to monopolize the aftermarket for iOS applications.”<sup>5</sup> Consumer Plaintiffs claim that Apple has restricted iOS app downloads and in-app purchases in iOS apps and has “cornered 100% of the worldwide distribution market for iOS applications” and in-app purchases.<sup>6</sup> They further claim that Apple first built relationships with consumers by offering them the iPhone, then “foreclosed iPhone consumers from buying software from any source other than Apple,” and thereby locked them into the relationship with Apple.<sup>7</sup> Consumer Plaintiffs assert that while Apple communicated to developers that iOS apps cannot be sold outside the App Store and that Apple charges commissions, Apple has never acquired consumers’ consent to “(a) Apple’s monopolization of and collection of monopoly profits from the iOS applications aftermarket, or (b) having their iOS Devices locked to prohibit Plaintiffs from using any app that was not approved or sold by Apple.”<sup>8</sup>

16. Consumer Plaintiffs claim that as a result of this challenged conduct, Apple has “totally eliminate[ed] any and all competition in that multibillion dollar market,” enabling it to charge a supracompetitive 30 percent commission rate to iOS app developers.<sup>9</sup> Plaintiffs further allege that Apple controls “what prices developers can charge ... by insisting that every paid app be priced in dollar increments at \$0.99, \$1.99, \$2.99, and so forth.”<sup>10</sup> Consumers do not pay any commission to Apple, but consumer Plaintiffs claim that because developers are paying an alleged supracompetitive commission to Apple that “iOS Device consumers

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<sup>3</sup> Order Granting Stipulation for Leave to File Third Amended Consolidated Class Action Complaint, September 17, 2020, (“Consumer Complaint”), ¶ 62.

<sup>4</sup> Developer Plaintiffs’ Motion for Class Certification, *Donald R. Cameron, et al., v. Apple Inc.*, June 1, 2021, United States District Court, Northern District of California, Oakland Division, Case No. 4:19-cv-03074-YGR (“Developer Motion for Class Action”), p. 1

<sup>5</sup> Consumer Complaint, ¶ 4.

<sup>6</sup> Consumer Complaint, ¶ 4.

<sup>7</sup> Consumer Complaint, ¶ 8.

<sup>8</sup> Consumer Complaint, ¶¶ 46, 52.

<sup>9</sup> Consumer Complaint, ¶ 5.

<sup>10</sup> Consumer Complaint, ¶ 11.

nationwide have paid hundreds of millions of dollars more [to those developers] for iOS apps than they would have paid in a competitive market.”<sup>11</sup>

17. Consumer Plaintiffs filed complaints against Apple starting in 2011. In the original complaint and in Consumer Plaintiffs’ Second Amended Complaint, dated September 5, 2013, they focused on app purchases made on the iPhone.<sup>12</sup> They expanded their allegations with a Third Amended Complaint filed on September 17, 2020 in two aspects. First, they included in-app purchases in addition to app purchases, and second, they included iPad and iPod Touch apps and in-app purchases as part of their allegations.<sup>13</sup>

18. Similar to consumer Plaintiffs, developer Plaintiffs allege that the App Store shuts out competition for distributing iOS apps and that it “is exclusive and anti-competitive by design, and so, then, are Apple’s iOS distribution services. Apple insists that buyers of its devices purchase apps and in-app products only through the App Store.”<sup>14</sup> Developer Plaintiffs claim that this has caused anticompetitive harm to developers due to an alleged supracompetitive commission rate (30 percent), an annual fee (\$99), and a minimum price of \$0.99 and price tiers that end in 99 cents.<sup>15</sup>

19. Developer Plaintiffs claim that there are at least three sets of consequences of Apple’s policies. First, alleged supracompetitive commissions “have cut unlawfully into what would have been developers’ earnings in a competitive atmosphere.”<sup>16</sup> Second, they claim that Apple’s policies have depressed app developers’ output of apps and in-app products.<sup>17</sup> Finally, because all available iOS apps and in-app purchases are only available on the App Store, apps are harder to discover.<sup>18</sup>

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<sup>11</sup> Consumer Complaint, ¶ 5.

<sup>12</sup> Second Amended Consolidated Class Action Complaint, *In re Apple iPhone Antitrust Litigation*, September 5, 2013, United States District Court, Northern District of California, Oakland Division, Case No. 4:11-cv-06714-YGR, ¶ 54 (“Plaintiffs propose to act as representatives of the following Class comprised of: All persons in the United States, exclusive of Apple and its employees, agents and affiliates, and the Court and its employees, who purchased an iPhone application or application license from Apple for use on an iPhone at any time from December 29, 2007 through the present.”).

<sup>13</sup> Consumer Complaint, ¶¶ 8–9.

<sup>14</sup> Plaintiff’s Consolidated Class Action Complaint for Violations of the Sherman Act and California Unfair Competition Law, *Donald R. Cameron, et al. v. Apple, Inc.*, September 30, 2019, United States District Court, Northern District of California, Oakland Division, Case No. 4:19-cv-03074-YGR (“Developer Complaint”), ¶ 29.

<sup>15</sup> Developer Complaint, ¶ 3.

<sup>16</sup> Developer Complaint, ¶ 3.

<sup>17</sup> Developer Complaint, ¶ 4.

<sup>18</sup> Developer Complaint, ¶ 5.

#### 4. SUMMARY OF OPINIONS

20. My analysis in this matter focuses on assessing the expert opinions put forward by Professors Economides, Elhauge and McFadden. Specifically, I assess their opinions regarding market definition, Apple's alleged market power or monopoly power, Apple's allegedly anticompetitive conduct, and the existence and extent of injury. Each of Plaintiffs' experts claims that common facts and methods are available in order to draw conclusions on these topics and to compute damages, if any, for every proposed member of both the developer and consumer classes. Based on my extensive analysis of available data, documents, and testimony, I have reached the following opinions:

#### MARKET REALITIES

21. **Opinion 1.** The impact of Apple's challenged conduct on any given developer or consumer requires individualized analysis as a result of the different competitive conditions under which they transact. Industry facts show that individual developers and consumers use the App Store for transacting different types of apps under different market conditions and subject to different Apple policies, and pay different app commissions and prices. (Section 5, pp. 17–65)

22. **Opinion 2.** Apple's conduct and pricing is not common for all app transactions between developers and consumers and has changed over time. Different transactions are governed by different policies and are subject to different commission rates, ranging from zero to 30 percent. The commissions paid vary depending on the product; size of the developer; choices made by the developer, such as participation in certain Apple programs or their chosen monetization strategy, and the time of the transaction. (Section 5.2, pp. 18–28)

23. **Opinion 3.** There is no typical developer. Because it excludes developers of free apps, the proposed developer class represents only 67,938 (or less than 5 percent) of the 1.35 million developers that have transacted with consumers through the U.S. App Store storefront during the developer class period. But even this relatively small subset of developers varies greatly in the type and number of apps that they make available in the App Store, as well as the App Store policies that apply to them. These differences affect the commissions they pay and the impact of other challenged conduct. Some developers enjoy the benefits of the App Store without paying commissions on some or perhaps most of their revenue while others have chosen to principally transact through the App Store. And, the extent to which developers can and do earn revenue outside the App Store is highly individualized. (Section 5.3, pp. 28–41)



24. **Opinion 4.** There is no typical consumer. The proposed consumer class represents 45 percent of the 455 million consumer accounts that have transacted with developers through the U.S. App Store storefront during the consumer class period because it excludes consumer accounts that only transact free apps. The proposed consumer class accounts range greatly in the types of apps, number of apps, types of purchases (i.e. downloads versus in-app purchases), types of devices used, the developers with which they transact, and policies that govern the app transactions they have made. Because consumers purchase apps from different developers, they are subject to different marketplace conditions and are impacted differently by Apple's conduct. (Section 5.4, pp. 41–48)

#### **BUT-FOR COMMISSION RATES**

25. **Opinion 5.** Plaintiffs' experts agree that to assess harm to any proposed developer or consumer class member requires knowing the but-for commission rates that would be paid for each transaction made by the class member. Yet none of Plaintiffs' experts provide an actual method for determining how any claimed additional competition would impact but-for commission rates for each class member transaction (nor for the free app transactions they exclude from their analysis). (Section 6, pp. 65–114)

26. **Opinion 6.** Industry analysis unequivocally shows that, almost without exception, app transaction platforms serving mobile devices, PCs, and consoles share a common 30 percent headline commission rate, and there has not been, and is not, any single, consistent commission rate below 30 percent that applies for all app transaction platforms for any type of device. Industry analysis also shows that each app transaction platform may have (or may not have) offered other commission rates that have varied over time and that depend on a variety of individualized circumstances including the type of app, the developer, the amount of revenue, and individual negotiation. (Section 5.5, pp. 48–65)

27. **Opinion 7.** Professors Economides, Elhauge, and McFadden claim that there would have been *uniform* but-for commission rates for all iOS apps that were much lower than those typically charged by existing competitive app transaction platforms. These claims of a uniform reduction are *assumptions* and inconsistent with observed pricing behavior of app transaction platforms, including the platforms they use to determine their benchmark rates. Thus, Plaintiffs' experts can neither demonstrate class-wide impact nor accurately determine the commission that any developer or consumer would face for an individual transaction, or transactions in aggregate, absent Apple's challenged conduct. (Section 6.1, pp. 69–71)

28. **Opinion 8.** Professor Economides' and McFadden's uniform but-for app commission rate *levels* are demonstrably divorced from market realities. To arrive at their but-for

commission rates, each cherry-picks some of the lowest commission rates ever charged by any app transaction platform and heavily focuses on platforms that are defunct or have never been profitable. Professor Economides additionally relies on an assumption, incorrectly and without basis, that costs for direct distribution are equivalent to a commission for third-party distribution. All three of Plaintiffs' economic experts ignore that even their cherry-picked commission rates do not apply across the entire class period, an error that cause them to vastly overstate harm. (Section 6.2, pp. 72–98) Professor Elhauge provides no empirical analysis of commission rates on other transaction platforms, and thus has no legitimate basis to opine that Apple charged supracompetitive commissions through the entire class period. (Section 6.3, pp. 98–101)

29. **Opinion 9.** Empirical study shows that in the but-for world Apple would most likely continue to charge the same 30 percent headline commission rate as it does today, even if facing competition with other app transaction platforms, some of which may offer lower commission rates. My empirical analysis establishes that many app transaction platforms continue to charge a 30 percent headline commission rate even when facing head-to-head rivalry from alternative app transaction platforms and direct distribution on the same device. (Section 6.4, pp. 101–102)

30. **Opinion 10.** Apple is also likely to charge a headline 30 percent commission rate in the but-for world because it would continue to offer a high-quality, differentiated product in Plaintiffs' but-for world, and continue to benefit from substantial indirect network effects. Under these conditions, many and perhaps even most app transactions would be expected to continue to be performed in the App Store and those consumers and developers who would solely transact through the App Store in the but-for world would therefore be unharmed. (Section 8.1.1, pp. 143–146)

31. **Opinion 11.** Determining which transactions developers and consumers would transact through the App Store, and which would instead transact elsewhere is a matter of individual inquiry, as is the question for which transactions, if any, developers would receive lower commission rates or for which consumers might pay lower prices. (Section 8.1.5, pp. 156–158) Because Plaintiffs experts admittedly have not offered or even attempted to analyze how developers and consumers choose among competing transaction platforms, they have not provided a common method to show that proposed developer or consumer class members have been harmed by the challenged conduct. (Section 8.1.6, pp. 158–159)

32. **Opinion 12.** My analysis shows that many proposed developer and consumer class members would be unharmed if one assumes that, rather than keeping its existing commission policy in the but-for world, Apple instead changes aspects of its commission



policy in alternative ways. Under a number of alternative commission policies I exhibit the *minimum* number of unharmed class members, finding it to be as high as 99.5 percent of developers and 31.2 percent of consumers. Because Plaintiffs experts have failed to consider any pricing strategy that could be taken by Apple or other app transaction platforms other than offering uniform and unrealistically low commissions in the but-for world, they have provided no common method to show that proposed developer or consumer class members have been harmed by the challenged conduct. (Section 6.5, pp. 103–114)

## RELEVANT MARKET

33. **Opinion 13.** The relevant antitrust market to assess the impact of Apple’s policies, pricing, and innovations is not common to all proposed developer and consumer class members’ app transactions because empirical analysis shows that competitive conditions and substitution possibilities are not the same for all iOS app transactions. Plaintiffs’ experts’ analyses are incorrectly premised on a single market for iOS app distribution, which is both too broad (i.e., combining together disparate iOS app transactions that are in different relevant markets) and too narrow (i.e., excluding all non-iOS app transactions). (Section 7.1, pp. 117–129)

34. **Opinion 14.** Apple competes in multiple relevant markets in which different developers and consumers transact. There is a distinct relevant market for digital game transactions in which the App Store is a substitute for, and competes with, other digital game transaction platforms on other electronic devices. In my opinion there is also a distinct relevant market for TV and video streaming app transactions which face different competitive conditions, typically pay different commissions, and have available to them different options for transacting outside the App Store. Although I do not delineate every relevant market in which the App Store competes, my analysis shows that different developers and consumers participate in these markets to different extents, meaning that determining the appropriate relevant market requires individual analysis. (Section 7.2, pp. 129–134)

35. **Opinion 15.** Plaintiffs’ experts have applied faulty economics by concluding that an alleged App Store profit margin is proof of market power for their defined market. (Section 7.3, pp. 134–137)

## ESTABLISHING HARM

36. **Opinion 16.** Plaintiffs’ experts have not modeled or specified how the App Store would compete against hypothetical entrants or direct distribution alternatives, nor have they explained how consumers would make choices among differentiated alternative stores and, in

turn, which but-for commissions would apply. Instead, they assume average but-for commission rates that are lower and more uniform than seen in competitive app transaction platforms, and assert that these commissions would be charged by an arbitrary or unspecified number of app transaction platforms that split the market in an arbitrary (Professor Economides) or unspecified (Professor McFadden) way. Plaintiffs' experts ignore the real-world fact that app transaction platforms today are differentiated along many dimensions. (Section 8.1, pp. 141–159) Consistent with this differentiation, developers and consumers vary in terms of the app transaction platforms on which they choose to transact, often choosing an app transaction platform with higher commission rates. (Section 8.1.4, pp. 151–155)

37. **Opinion 17.** Plaintiffs offer no method to determine which developers would be able to distribute directly to consumers in the but-for world (Section 8.1.2, pp. 146–148) nor have they shown that a significant number of developers engage in direct distribution in settings that are not subject to Apple's challenged conduct in the actual world. My analysis shows that even many of the largest developers do not choose to distribute directly and thus that many developers are unlikely to distribute apps directly to consumers in the but-for world. To the extent any developers would choose to transact through direct distribution in the but-for world, it is a matter of individual inquiry to identify the developers who would distribute directly, which transactions would be direct, and the prices to the consumer and costs to the developer that would apply. (Section 8.1.3, pp. 148–151) Plaintiffs have offered no method to do so. (Section 8.1.6, pp. 158–159)

38. **Opinion 18.** As a two-sided platform, Apple has many options for charging participants for the services they provide and have chosen to charge certain prices for some activities but not for others. In the but-for world, Apple would have an incentive to adopt different approaches to monetizing the App Store, and other iOS app transaction platforms could adopt completely different approaches from Apple's. (Section 8.2, pp. 159–167) I demonstrate that such changes would not have a common impact on all developers and consumers; rather some would be made better off and some worse off. Common facts thus would not allow one to determine whether any proposed developer or consumer class member has been harmed by Apple's challenged conduct relative to the but-for world. (Section 8.2.1–8.2.3, pp. 160–167)

39. **Opinion 19.** Even assuming a reduced commission in the but-for world, it is an empirical question as to whether a developer would change its prices, and if so, by how much. Plaintiffs' experts disagree over this question, but neither has provided a reliable method to answer it. Rather, they each apply demonstrably false assumptions to all developers – for example, that each developer is a monopolist for each app provided to the marketplace. My analysis shows that, were there a commission change, the change in price that developers

charge for their apps, if any, would be expected to vary depending on the app. Thus, to reliably measure the existence and extent of pass-through (and thus damages) would require individual inquiry into the competitive circumstances regarding the specific app in question. (Section 8.3, pp. 167–180)

40. **Opinion 20.** Professor Economides’ damages methodology is unreliable and cannot be used to determine damages for a given proposed developer class member or the developer class as a whole. To calculate “effective” commission rates, Professor Economides uses inappropriate benchmarks, does not rely on actual commission rates or distribution costs, and makes basic errors in his calculations. (Section 9.1–9.2, pp. 181–184) Correcting some of his most basic errors leads to much higher effective commission rates, fewer harmed class members and lower aggregate damages. (Section 9.3–9.4, pp. 185–190) Additionally, Professor Economides’ “rival profit yardstick” is unusable as it is based on unsupported assumptions and generates nonsensical economic results. (Section 9.5, p. 190)

## 5. BACKGROUND

### 5.1. Parties

41. Apple Inc. (“Apple”) is a technology company that designs and sells smartphones (iPhones), tablets (iPads), computers (Macs), and other consumer products. Apple designs and provides the operating system (“OS”) for these devices, known as iOS for its smartphones, iPadOS for tablets (note that I will refer to the operating system for smartphones and tablets as iOS for simplicity), macOS for its computers, and watchOS for its Apple Watch.<sup>19</sup> Apple also designs and provides some application software available for these products.<sup>20</sup> In the third quarter of FY2021 Apple’s consumer products accounted for 78.5 percent (or \$63.9 billion) of the company’s global revenues.<sup>21</sup>

<sup>19</sup> Apple, “iOS14,” available at <https://www.apple.com/ios/ios-14/>, accessed on February 8, 2021; Apple, “iPadOS,” available at <https://www.apple.com/ipados/ipados-14/>, accessed on February 8, 2021; Apple, “macOS Big Sur,” available at <https://www.apple.com/macOS/big-sur/>, accessed on February 8, 2021; Apple, “watchOS 7,” available at <https://www.apple.com/watchos/watchos-7/>, accessed on February 8, 2021.

<sup>20</sup> Reuters, “Apple Inc APPL.O,” available at <https://www.reuters.com/companies/AAPL.O>, accessed on February 8, 2021.

<sup>21</sup> Apple reported \$63.9 billion in net sales of products, \$16.9 billion in net sales of services, and \$81.4 billion in net sales overall. See Apple, “Condensed Consolidated Statements of Operations (Unaudited),” 2021, available at [https://www.apple.com/newsroom/pdfs/FY21\\_Q3\\_Consolidated\\_Financial\\_Statements.pdf](https://www.apple.com/newsroom/pdfs/FY21_Q3_Consolidated_Financial_Statements.pdf), accessed on August 3, 2021.

42. In addition, Apple sells services for these devices, including Apple Music, iCloud, and AppleTV.<sup>22</sup> Of most relevance here, Apple provides the App Store through which app developers transact with existing and new customers with iOS devices.<sup>23</sup> In the third quarter of FY2021, Apple's services accounted for 21.5 percent (or \$17.5 billion) of the company's global revenues.<sup>24</sup>

43. App developers are individuals, firms, or other entities that create apps compatible for different types of hardware systems, including PCs, mobile phones and tablets, and consoles, and for different operating systems.<sup>25</sup> The App Store enables transactions between consumers who own iOS devices and app developers that develop iOS apps compatible with iOS devices, including iPhones and iPads. Consumers that use the App Store are iOS device owners who download and interact with apps from developers that have created apps for iOS.

## 5.2. *Apps and the App Store*

### 5.2.1. *Apps*

44. Apps, short for software applications, are software programs that end users use on devices. App developers create, and consumers use, apps compatible for many different types

<sup>22</sup> Apple, "Apple Music," available at <https://www.apple.com/apple-music/>, accessed on August 7, 2021; Apple, "TV," available at <https://www.apple.com/tv> accessed August 7, 2021; Apple "iCloud" available at <https://www.apple.com/icloud> accessed August 7, 2021.

<sup>23</sup> Apple, "App Store," available at <https://www.apple.com/ios/app-store/principles-practices/>, accessed on February 8, 2021 ("App Store Principles and Practices").

<sup>24</sup> Apple reported \$63.9 billion in net sales of products, \$17.4 billion in net sales of services, and \$81.4 billion in net sales overall. See Apple, "Condensed Consolidated Statements of Operations (Unaudited)," 2021, available at [https://www.apple.com/newsroom/pdfs/FY21\\_Q3\\_Consolidated\\_Financial\\_Statements.pdf](https://www.apple.com/newsroom/pdfs/FY21_Q3_Consolidated_Financial_Statements.pdf), accessed on August 3, 2021.

<sup>25</sup> App developers create apps using development tools and general-purpose programming languages. The development tools are especially important to enable the app to interact with a device's operating system through application programming interfaces ("APIs"). For examples of development tools, see, e.g., Apple Developer, "Introducing SwiftUI," available at <https://developer.apple.com/tutorials/SwiftUI>, accessed on February 8, 2021 ("SwiftUI helps you build great-looking apps across all Apple platforms with the power of Swift — and as little code as possible. With SwiftUI, you can bring even better experiences to all users, on any Apple device, using just one set of tools and APIs."); Android Developers, "Download Android Studio and SDK Tools," available at <https://developer.android.com/studio>, accessed on July 27, 2021 ("Android Studio provides the fastest tools for building apps on every type of Android device."). For examples of general purpose programming languages that are appropriate for app development, see, e.g., Apple Developer, "Swift," available at <https://developer.apple.com/swift/>, accessed on February 8, 2021 ("SwiftUI is a modern way to declare user interfaces for any Apple platform. Create beautiful, dynamic apps faster than ever before."); Gary Sims, "I want to develop Android apps—What languages should I learn?" *Android Authority*, August 10, 2019, available at <https://www.androidauthority.com/develop-android-apps-languages-learn-391008/>, accessed on February 8, 2021 ("Java is an official language of Android development... Android Studio also supports C++"). See also, RedHat, "What is an SDK?" available at <https://www.redhat.com/en/topics/cloud-native-apps/what-is-SDK>, accessed on February 8, 2021 ("A software development kit (SDK) is a set of tools provided by the manufacturer of (usually) a hardware platform, operating system (OS), or programming language. SDKs help developers create applications specific to that platform, system, or programming language... Typically, a basic SDK will include a compiler, debugger, and application programming interfaces (APIs).").

of hardware systems, including PCs, mobile phones and tablets, and consoles, and for many different operating systems.<sup>26,27</sup> In general, I will refer to the different hardware and operating systems that support the use of apps as “devices.”

45. Historically, the term “app” was used broadly for software applications.<sup>28</sup> The modern usage of the term was popularized with the emergence of handheld computers and mobile phones and the development of software that could extend the functionality of these devices.<sup>29</sup> Users of these devices were able to “keep notes, manage contacts, play games, and view and manage other documents” including email.<sup>30</sup>

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<sup>26</sup> App developers create apps using development tools and general-purpose programming languages. The development tools are especially important to enable the app to interact with a device’s operating system through application programming interfaces (“APIs”). RedHat, “What is an SDK?” available at <https://www.redhat.com/en/topics/cloud-native-apps/what-is-sdk>, accessed on February 8, 2021 (“A software development kit (SDK) is a set of tools provided by the manufacturer of (usually) a hardware platform, operating system (OS), or programming language. SDKs help developers create applications specific to that platform, system, or programming language... Typically, a basic SDK will include a compiler, debugger, and application programming interfaces (APIs).”).

<sup>27</sup> See, e.g., Microsoft, “Windows Apps,” available at <https://www.microsoft.com/en-us/store/apps/windows>, accessed on February 8, 2021 (for PCs); Apple, “App Store,” available at <https://www.apple.com/app-store/>, accessed on February 6, 2021 (for mobile phones and tablets); Nintendo, “Game Store,” available at <https://www.nintendo.com/games/buy-digital/>, accessed on February 8, 2021 (for consoles); Samsung, “Apps on your Samsung smart TV,” available at <https://www.samsung.com/us/support/answer/ANS00062169/>, accessed on February 8, 2021 (for smart TVs); Roku, “Channel Store,” available at <https://channelstore.roku.com/browse/apps>, accessed on February 6, 2021 (for TV streaming devices); Oculus, “Quest Store: VR Games, Apps, & More,” available at <https://www.oculus.com/experiences/quest/>, accessed on February 6, 2021 (for virtual reality equipment); Clairbelle Deveza, “Tesla App Store Could Be the Next Level Ecosystem for the EV Automaker,” *Tesmanian*, July 23, 2020, available at <https://www.tesmanian.com/blogs/tesmanian-blog/tesla-tsla-app-store-full-self-driving>, accessed on February 8, 2021 (for automobiles); Apple, “watchOS 7,” available at <https://www.apple.com/watchos/watchos-7/>, accessed on February 8, 2021 (for wearables).

<sup>28</sup> Mike Ricciuti, “Microsoft apps all business,” *CNet*, January 2, 2002, available at <https://www.cnet.com/news/microsoft-apps-all-business/>, accessed on February 8, 2021.

<sup>29</sup> American Dialect Society, “‘App’ voted 2010 word of the year by the American Dialect Society (UPDATED),” January 8, 2011, available at <https://www.american-dialect.org/app-voted-2010-word-of-the-year-by-the-american-dialect-society-updated>, accessed on February 8, 2021 (“‘App has been around for ages, but with millions of dollars of marketing muscle behind the slogan ‘There’s an app for that,’ plus the arrival of ‘app stores’ for a wide spectrum of operating systems for phones and computers, app really exploded in the last 12 months.”).

<sup>30</sup> Computer Hope, “PalmPilot,” December 16, 2018, available at <https://www.computerhope.com/jargon/p/palmpilot.htm>, accessed on January 30, 2021; David Friend, “RIM’s rise and fall: A short history of Research In Motion,” *The Canadian Press*, January 28, 2013, available at <https://globalnews.ca/news/384832/rims-rise-and-fall-a-short-history-of-research-in-motion/>, accessed on February 8, 2021 (“It was a two-way communicator that also had the ability to send faxes, as well as link to the Internet and email.”); Julie Strietelmeier, “Palm V Review,” *The Gadgeteer*, February 28, 1999, available at [https://the-gadgeteer.com/1999/02/28/palm\\_v\\_review/](https://the-gadgeteer.com/1999/02/28/palm_v_review/), accessed on February 8, 2021 (“Application that lets you manage the email that you send and receive through the email application on your desktop computer. You can read, reply to, compose, and delete email on your Palm V but to send or receive you have to sync to your PC or use a modem.”).

### 5.2.2. The App Store

46. In 2007, Apple introduced its first iPhone to the market.<sup>31</sup> Steve Jobs, a key developer of the concepts leading to the iPhone's success, understood that "going forward, the phone of the future will be differentiated by software."<sup>32</sup> At the time of the iPhone's launch, third-party native iPhone applications were not available for download on the iPhone.<sup>33</sup> At the iPhone's launch in 2007, Jobs stated that web-based apps would be a model to bring a variety of apps to iPhone users, announcing that web-based apps "look exactly and behave exactly like apps on the iPhone. And these apps can integrate perfectly with the iPhone services. They can make a call, they can send an email, they can look up a location on Google Maps."<sup>34</sup> However, Apple changed its course and Jobs announced "We want native third-party applications on the iPhone, and we plan to have an SDK [i.e., software development kit] in developers' hands in February [2008]."<sup>35</sup>

47. Jobs ultimately decided to allow third party native apps on Apple devices by enacting strict approval policies that left significant control over the set of allowed apps with Apple.<sup>36</sup> This way Apple would be able to provide the benefits of externally developed software while ensuring the device's health and sustaining the ecosystem that Apple has built around its devices. (I will refer to native apps as "apps" in the rest of this report.)

48. At its launch in July 2008, the App Store provided 538 third-party apps by 351 distinct developers through the App Store's U.S. storefront. In its first year of operation, consumers

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<sup>31</sup> Apple, "Apple Reinvents the Phone with iPhone," January 9, 2007, available at <https://www.apple.com/newsroom/2007/01/09Apple-Reinvents-the-Phone-with-iPhone/>, accessed on February 8, 2021.

<sup>32</sup> Nick Wingfield, "The Mobile Industry's Never Seen Anything Like This': An Interview With Steve Jobs at the App Store's Launch," *The Wall Street Journal*, July 25, 2018, available at <https://www.wsj.com/articles/the-mobile-industrys-never-seen-anything-like-this-an-interview-with-steve-jobs-at-the-app-stores-launch-1532527201>, accessed on February 8, 2021 ("WSJ Jobs Interview").

<sup>33</sup> Nick Wingfield, "Apple Opens iPhone to Outside Software," *The Wall Street Journal*, October 18, 2007, available at <https://www.wsj.com/articles/SB119263585523362090>, accessed on February 16, 2021 ("WSJ Third-Party Apps").

<sup>34</sup> 9to5Mac, "Jobs' original vision for the iPhone: No third-party native apps," October 21, 2011, available at <https://9to5mac.com/guides/iphone-2g/>, accessed on February 26, 2021 ("The full Safari engine is inside of iPhone. And so, you can write amazing Web 2.0 and Ajax apps that look exactly and behave exactly like apps on the iPhone. And these apps can integrate perfectly with iPhone services. They can make a call, they can send an email, they can look up a location on Google Maps.>").

<sup>35</sup> WSJ Third-Party Apps.

<sup>36</sup> Stuart Dredge, "Steve Jobs resisted third-party apps on iPhone, biography reveals," *The Guardian*, October 24, 2011, available at <https://www.theguardian.com/technology/appsblog/2011/oct/24/steve-jobs-apps-iphone>, accessed on February 8, 2021 ("Levinson,... [described] Apple's approvals policy on the App Store as 'an absolutely magical solution that hit the sweet spot. It gave us the benefits of openness while retaining end-to-end control.'"); Epic Trial Testimony of Phillip Schiller (Apple), p. 2737 ("Q: ... What were the business reasons that Apple decided that it would only distribute third-party native apps on its App Store? A. ... Maintaining the quality of iPhone, maintaining the security and privacy of our users were all critical to the idea of opening it up for native apps. Q. And have those priorities for privacy, security, and reliability ever changed? A. No.").



made 604 million free and paid downloads of third-party apps. At this time, 32 percent of the apps available in the App Store were free to device owners to download.<sup>37</sup> By FY2020, the App Store had 1.7 million apps from over 687,000 developers. Figure 1 and Figure 2 show the growth in transactions and developer revenue through the App Store since its launch in 2008. Figure 1 shows the number of free and paid app downloads and in-app purchases (i.e., transactions) over time. Consumers downloaded apps more than 9.1 billion times in FY2020. The proportion of free-to-download apps has also grown: in FY2020, 92 percent of the apps, or 1.6 million, were free (a growth of over 9,000 percent from 2008).<sup>38</sup> In-app purchase transactions have increased from nearly 206,000 in-app purchase transactions in the first year after they were introduced on the App Store in FY2009 to nearly 2.1 billion in FY2020 (an increase of over one million percent).<sup>39</sup> Figure 2 presents developer revenue, i.e., billings minus commission to Apple. Developer revenue amounted to \$14.2 billion in FY2020, an increase of over 12,900 percent from the \$109 million in revenue developers earned in 2008.<sup>40</sup> Transactions through the App Store constituted only a small share of the total value of the app-based commerce associated with the App Store (including in-app advertising, physical goods and services, and digital goods and services), which was estimated to be \$643 billion in 2020.<sup>41</sup>

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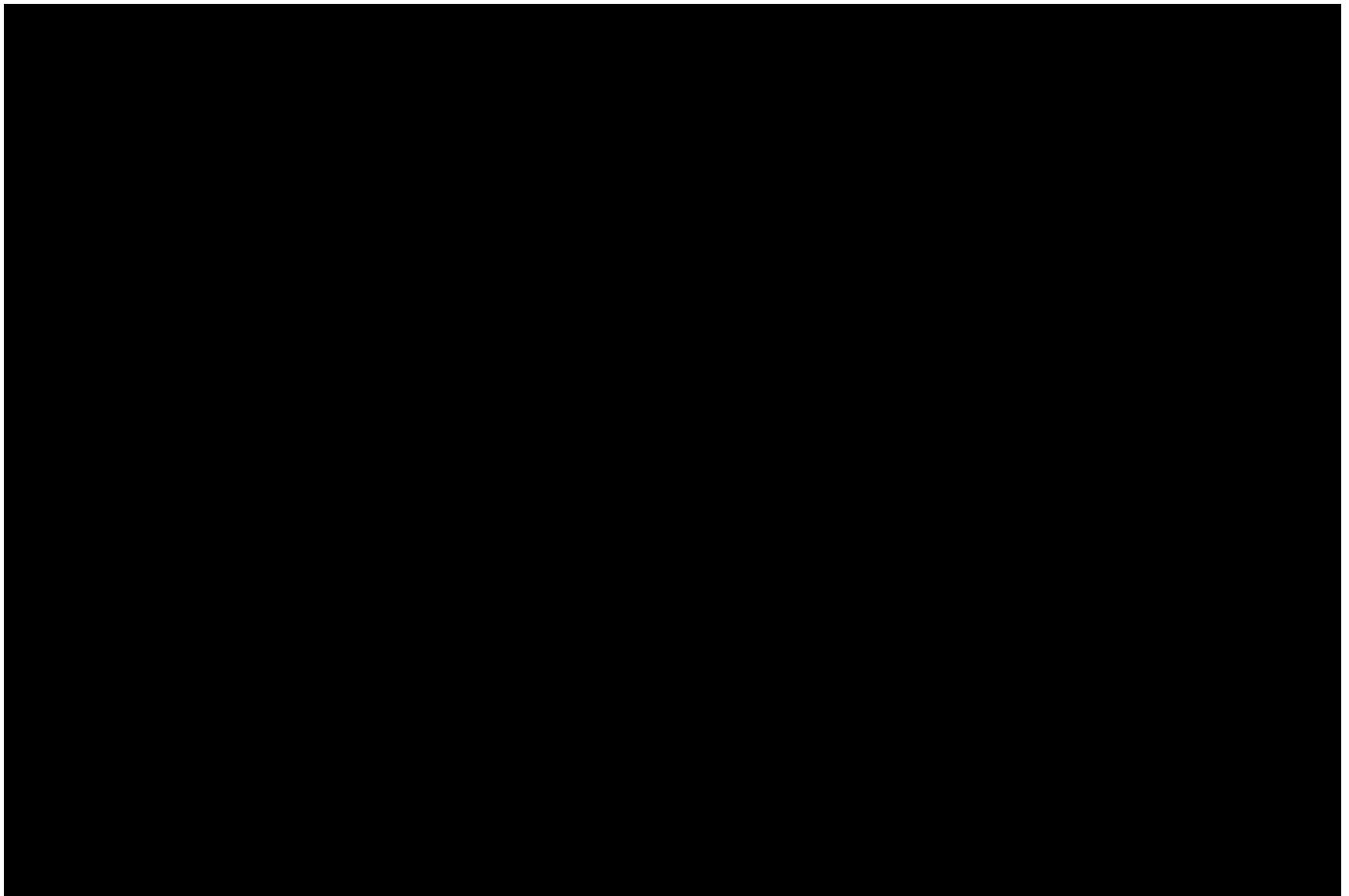
<sup>37</sup> See my workpapers. First year figures include all transactions during the period July 10, 2008 to July 9, 2009.

<sup>38</sup> See my workpapers. First year figures include all transactions during the period July 10, 2008 to July 9, 2009.

<sup>39</sup> See my workpapers.

<sup>40</sup> See my workpapers. First year figures include all transactions during the period July 10, 2008 to July 9, 2009.

<sup>41</sup> Jonathan Borck et al., “A Global Perspective on the Apple App Store Ecosystem” *Analysis Group*, June 2021, available at <https://www.apple.com/newsroom/pdfs/apple-app-store-study-2020.pdf>, (“Borck et al. 2021”), p. 2 (“We estimate that the App Store ecosystem facilitated \$643 billion in billings and sales worldwide in 2020.2 \$86 billion originated from billings and sales of digital goods and services (13% of the total), \$511 billion from sales of physical goods and services through apps (80% of the total), and \$46 billion from in-app advertising (7% of the total).”).

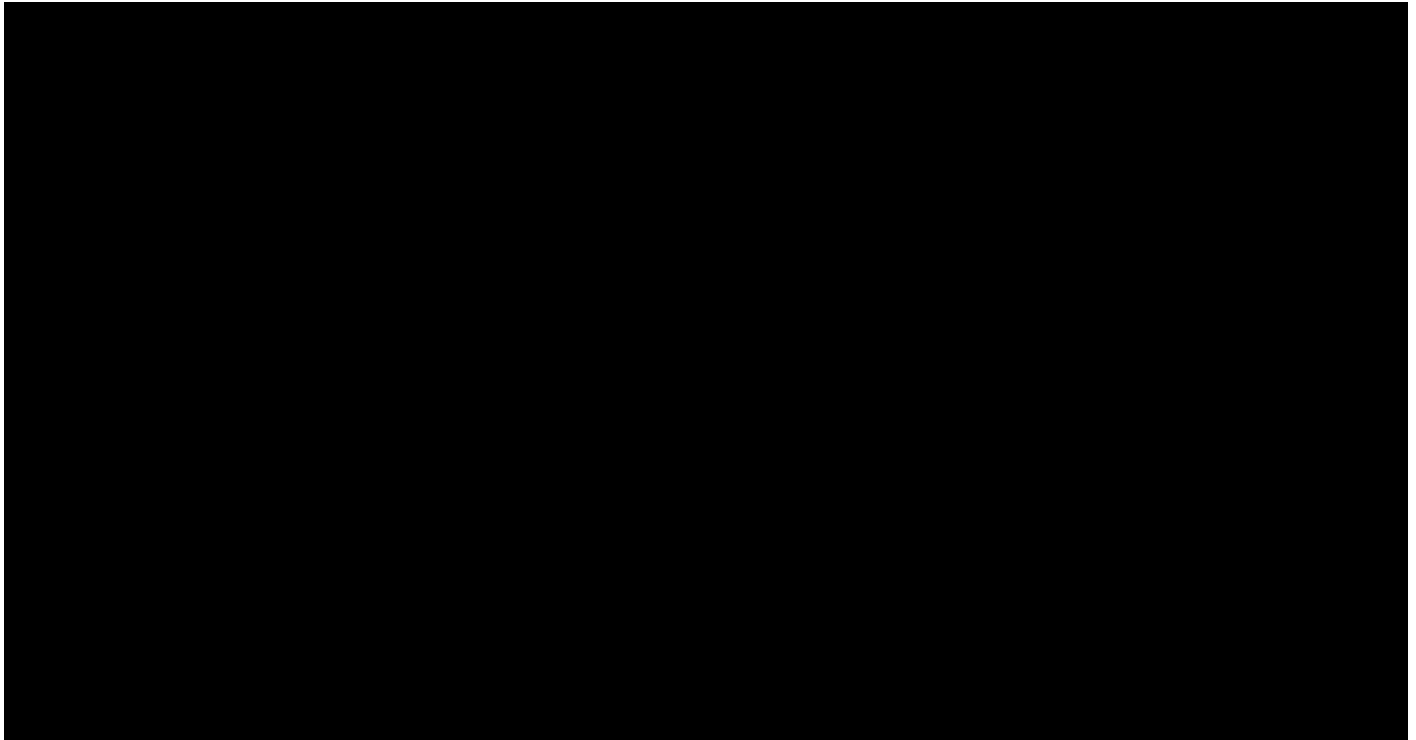


Source: Apple Transaction Data

Note: Only original transactions from in-app purchases and initial downloads are included. Transactions where Apple is the developer are excluded. See Appendix F for details regarding Apple transaction data processing.

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**FIGURE 2*****Developer revenue from App Store initial downloads and in-app purchases (July 10, 2008 – March 31, 2021)***

Source: Apple Transaction Data

Note: In the year following the App Store's launch on July 10, 2008, transaction revenue for developers totaled [REDACTED]. In FY2020, transaction revenue for developers totaled [REDACTED]. Transactions where Apple is the developer are excluded. Revenue is developer revenue from in-app purchases and initial downloads. See Appendix F for details regarding Apple transaction data processing.

49. Consistent with a phrase Apple popularized (“there’s an app for that”), hundreds of thousands of developers have offered a wide variety of apps on the App Store. Developers categorize these apps into 27 broad app genres, each of them selecting the relevant app genre for each of its apps.<sup>42</sup> Figure 3 shows the number of unique apps offered in each main App Store genre.<sup>43</sup> However, even within a broadly defined app genre there are many different types of apps. As one example, the Lifestyle genre includes dating apps such as Tinder, smart

<sup>42</sup> Apple Developer, “Choosing a Category,” available at <https://developer.apple.com/app-store/categories/>, accessed on August 2, 2021. Developers can currently choose from 26 app genres. The Apple Transactional Data shows more app genres because Apple changed the set of available app genres in 2017 to remove the catalog category. See Benjamin Mayo, “Apple removes Dice Games, Educational Games, and Catalogs categories from App Store,” *9to5Mac*, October 4, 2017, available at <https://9to5mac.com/2017/10/04/dice-games-catalogs-removed-app-store/>, accessed on August 1, 2021 (“Apple has today announced that it is removing the Catalogs category, as well as the Educational and Dice subcategory (under Games) from the App Store.”).

<sup>43</sup> Apps in the App Store transaction data are organized by app ids. While an app developer may change the name of an app over time, I understand that the app id should remain consistent over time. A developer can also change how it monetizes an app over time, for example, by changing whether it charges for an app download, and maintain the same app id. The app developer may also change the app genre for the app over time while maintaining the same app id. If an app developer introduces a new app, that app would receive a new app id. For more details on the App Store transaction data, see Appendix F.

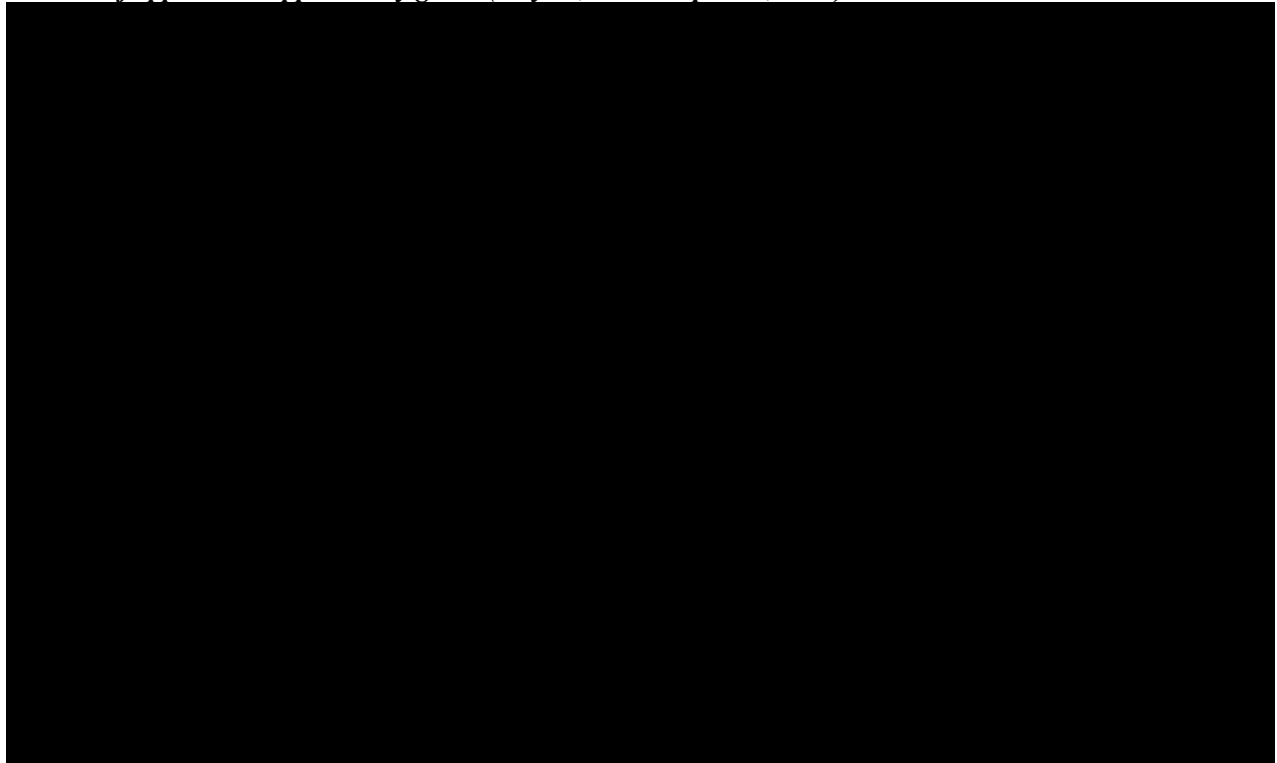
home apps such as Amazon Alexa and various Google Home apps, image sharing apps such as Pinterest, real estate apps such as Zillow and Redfin, and more.<sup>44</sup>

50. The Games genre is the largest by number of apps on the App Store, followed by Business, Education, and Lifestyle. In terms of revenue from app downloads and in-app purchases on the App Store, Games account for [REDACTED] percent of App Store revenue in FY2020, followed by Entertainment accounting for [REDACTED] percent of App Store revenue FY2020, and Music accounting for [REDACTED] percent of App Store revenue FY2020.<sup>45</sup>

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**FIGURE 3**

*Number of apps in the App Store by genre (July 10, 2008 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only apps with at least one original download transaction are included. Transactions where Apple is the developer are excluded. See Appendix F for details regarding Apple transaction data processing.

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<sup>44</sup> For the “Lifestyle” examples listed, see App Annie, “Top Apps on iOS, United States, Lifestyle,” July 26, 2021, available at <https://www.appannie.com/en/apps/ios/top/united-states/lifestyle/iphone/>, accessed on July 27, 2021. Because app genres are broadly defined (and often defined differently for different platforms), and not defined based on an economic approach to market definition, so I do not assume that apps within the same App Store genre face the same competitive conditions or are substitutes for each other.

<sup>45</sup> See my workpapers.

### 5.2.3. *How the App Store generates revenues for Apple*

51. As discussed in detail in Professor Schmalensee's report, the App Store is a two-sided platform that allows developers and consumers to transact with each other.<sup>46</sup> As such, the App Store provides a variety of services and features to both developers and consumers. Like other operators of two-sided platforms, and app marketplaces in particular, Apple has chosen to run the App Store by charging fees for certain services and features (or bundles of services and features) while offering many other services and features for free.<sup>47</sup> In particular, Apple charges developers a commission for paid downloads and digital in-app purchases as well as an annual developer fee to transact through the App Store.<sup>48</sup> Apple does not charge consumers directly for using the App Store.<sup>49</sup>

52. At the inception of the App Store, Apple set a 30 percent commission rate to developers for all paid app downloads.<sup>50</sup> When Apple introduced in-app purchases of digital app content, it set the same 30 percent commission rate. Over time, Apple has introduced lower commissions for certain types of apps and certain types of in-app purchases. For example, in 2016, Apple introduced a lower commission rate of 15 percent on subscription renewals after the first year.<sup>51</sup> That same year, Apple lowered its commission rate to 15 percent for

<sup>46</sup> Expert Report and Declaration of Richard Schmalensee, Ph.D., August 10, 2021, ("Schmalensee Report"), Section VII.D.

<sup>47</sup> Schmalensee Report, Section VII.A.

<sup>48</sup> Apple, "Choosing a Membership," available at <https://developer.apple.com/support/compare-memberships/>, accessed on February 8, 2021 ("...join the Apple Developer Program.... 99 USD per membership."); Apple, "Apple Developer Program License Agreement, Schedule 2," September 11, 2020, APL-APPSTORE\_10137343 – 388 ("Apple DPLA Schedule 2") at APL-APPSTORE\_10137345 – 6 ("... Apple shall be entitled to a commission equal to thirty percent (30%) of all prices payable by each End-User. Solely for auto-renewing subscription purchases made by customers who have accrued greater than one year of paid subscription service within a Subscription... Apple shall be entitled to a commission equal to fifteen percent (15%) of all prices payable by each End-User for each subsequent renewal.").

<sup>49</sup> Apple iPhone Software Event Transcript, "iPhone SDK Launch", March 6, 2008, APL-APPSTORE\_00000055–87 at APL-APPSTORE\_00000074–6 ("[The] way we are going to do it is what we call the 'App Store.' This is an application we've written to deliver apps to the iPhone and we are going to put it on every single iPhone with the next release of the software ... we are going to ship this to every iPhone customer in June and it's going to be a free software update. So that's how we are going to roll this out. ... In just a few months every iPhone user is going to have everything you saw today right on their phone as a free software update.")

<sup>50</sup> Apple Developer, "3. Distribute your application," archived on December 4, 2008, available at <https://web.archive.org/web/20081204015122/http://developer.apple.com/iphone/program/distribute.html>, accessed on August 1, 2021.

<sup>51</sup> Lauren Goode, "Apple's new subscription offerings are now available to App Store developers: The changes were first announced in June," *The Verge*, September 2, 2016, available at <https://www.theverge.com/2016/9/2/12774758/apple-developers-app-store-new-subscription-rules>, accessed on February 8, 2021 ("Perhaps more notably is the change in revenue split: for app developers who have long-term paying subscribers, Apple will only take a 15 percent revenue cut after a year, rather than the standard rev-share plan, in which Apple takes a 30 percent cut and gives the developer 70 percent."); Apple Developer, "Auto-renewable Subscriptions," available at <https://developer.apple.com/app-store/subscriptions/>, accessed on February 8, 2021 ("The net revenue structure for auto-renewable subscriptions differs from other business models on the App Store. During a subscriber's first year of service, you receive 70% of the subscription price at each billing cycle, minus applicable taxes. After a subscriber accumulates one year of paid service, your net revenue increases to 85% of the subscription price, minus applicable taxes.").

members of the Video Partner Program that stream premium TV content.<sup>52</sup> Most recently, Apple introduced the Small Business Program (“SBP”) under which it decreased its commission rate to 15 percent for developers who earned less than \$1 million in total proceeds from the App Store in a given year.<sup>53</sup> These reduced commissions are available to any developer that qualifies based on size, type of purchase, or type of app. As of May 13, 2021, i.e. less than five months after the program’s launch, █████ percent of all developers with any transactions in the data are enrolled in the SBP.<sup>54</sup>

53. Apple does not charge any commission to developers when consumers download free-to-download apps.<sup>55</sup> Apple also does not charge a commission on other activities that occur within an app, such as in-app advertising or the sale of physical products, and Apple does not charge a commission for the purchase of content or services made outside the App Store for use within iOS apps.<sup>56</sup> One study estimated that 90 percent of total developer billings and sales in 2020 were from transactions facilitated by the App Store ecosystem but not subject to Apple commissions.<sup>57</sup>

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<sup>52</sup> Apple Developer, “Apple Video Partner Program,” available at <https://developer.apple.com/programs/video-partner/>, accessed on February 8, 2021 (“Since 2016, the Apple Video Partner Program has enabled premium subscription video providers to participate in a new TV watching experience on the Apple TV app, helping customers discover the world’s best premium video content in one app, across all their devices... As a program member, you earn 85% of sales from customers who sign up using Apple’s in-app purchase system.”).

<sup>53</sup> Apple, “Apple announces App Store Small Business Program,” November 18, 2020, available at <https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/>, accessed on February 8, 2021 (“The App Store Small Business Program, which will launch on January 1, 2021, comes at an important time as small and independent developers continue working to innovate and thrive during a period of unprecedented global economic challenge.”); Apple Developer, “App Store Small Business Program,” available at <https://developer.apple.com/app-store/small-business-program/>, accessed on February 8, 2021 (“To participate in the program, you and your Associated Developer Accounts must have earned no more than 1 million USD in total proceeds (sales net of Apple’s commission and certain taxes and adjustments) during the 12 fiscal months occurring within the 2020 calendar year, and have earned no more than 1 million USD during the current year.”).

<sup>54</sup> This figure is calculated by dividing the number of developers enrolled in the SBP as of May 13, 2021 (49,295) by the number of third-party developers with an original transaction between December 23, 2020 (the first date of enrollment in the SBP enrollment data) and April 25, 2021 (556,887). The small difference in the timing of the numerator and denominator for this ratio are due to data limitations. See my workpapers.

<sup>55</sup> Apple App Store Principles and Practices,” available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on July 27, 2021 (“Free... Apple receives no commission from supporting, hosting and distributing these apps.”).

<sup>56</sup> Apple App Store Principles and Practices,” available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on July 27, 2021 (“Free with advertising... Apple receives no commission from supporting, hosting and distributing these apps... Apple receives no commission from...transactions for physical goods and services in the app... Apple receives no commission from the purchases made on other platforms and then used within the app.”); Apple Developer, “App Store Review Guidelines,” available at <https://developer.apple.com/app-store/review/guidelines/> (“App Store Review Guidelines”), 3.1.3(b).

<sup>57</sup> Borck et al. 2021, p. 2 (“About 90% of total billings and sales facilitated by the App Store ecosystem in 2020 occurred outside of the App Store, meaning that Apple collected no commission on those sales.”).

54. Apple allows developers to access the basic suite of developer tools for iOS for free.<sup>58</sup> Apple charges developers who wish to submit apps to transact on the App Store a fee of \$99 per year to participate in the Apple Developer Program.<sup>59</sup> Under this program, developers agree to pay a commission on any paid downloads and digital in-app transactions.<sup>60</sup> Developers who participate in this program receive, among other things, a limited license to access and use certain Apple software, tools, and other intellectual property;<sup>61</sup> security and privacy support;<sup>62</sup> marketing and technical support;<sup>63</sup> and an integrated mechanism for the delivery of and payment for digital goods and services.<sup>64</sup> The “bundle” of IP rights provides value to app developers. After developing an app, an app developer submits the app to Apple for approval, which is usually provided within 48 hours; after approval, the app can be downloaded to iOS devices through the App Store. Apple does not charge for this app review, and developers are allowed to re-submit an app for review free of charge if the app is

<sup>58</sup> Apple Developer, “Choosing a Membership,” available at <https://developer.apple.com/support/compare-memberships/>, accessed on February 8, 2021 (“You can learn how to develop apps for Apple platforms for free without enrolling. With just an Apple ID, you can access Xcode, software downloads, documentation, sample code, forums, and Feedback Assistant, as well as test your apps on devices.”).

<sup>59</sup> Apple Developer, “Choosing a Membership,” available at <https://developer.apple.com/support/compare-memberships/>, accessed on February 8, 2021 (“...join the Apple Developer Program.... 99 USD per membership.”); see also Apple Transcript, “iPhone SDK Product Launch,” March 6, 2008, APL-APPSTORE\_00000055 – 87 at APL-APPSTORE\_00000076 (“... you can join our iPhone Developer Program if you want to run the app on an iPhone or an iPod Touch.... And to join the Developer Program costs just \$99.00...”); Deposition of Matthew Fischer (Apple), Volume II, January 7, 2021, p. 365:5–10 (“The free program gives them access to tools and technologies, to help them build their apps, but the paid program is when they pay the -- the annual \$99 developer program fee that then gives them access to more capabilities, which includes submitting their apps for distribution on the App Store.”).

<sup>60</sup> Apple, “Apple Developer Program License Agreement, Schedule 2,” September 11, 2020, APL-APPSTORE\_10137343 – 88 (“Apple DPLA Schedule 2”) at APL-APPSTORE\_10137345 – 6 (“... Apple shall be entitled to a commission equal to thirty percent (30%) of all prices payable by each End-User. Solely for auto-renewing subscription purchases made by customers who have accrued greater than one year of paid subscription service within a Subscription... Apple shall be entitled to a commission equal to fifteen percent (15%) of all prices payable by each End-User for each subsequent renewal.”).

<sup>61</sup> Apple, “Apple Developer Program License Agreement,” June 22, 2020, APL-APPSTORE\_10137264 – 342 (“Apple DPLA”) at APPSTORE\_10137272, APPSTORE\_10137274 – 6, APPSTORE\_10137296 (“Apple hereby grants You during the Term, a limited, non-exclusive, personal, revocable, non-sublicensable and non-transferable license to (a) (a) Install a reasonable number of copies of the Apple Software.... You may use the FPS SDK to develop and test a server-side implementation of FPS.... Apple may provide access to Apple Services that Your Covered Products may call through APIs in the Apple Software and/or that Apple makes available to You through other mechanisms, e.g., through the use of keys that Apple may make accessible to You under the Program.... You are permitted to employ or retain a third party (‘Service Provider’) to assist You in using the Apple Software and Services provided pursuant to this Agreement.... You may use Apple’s developer tools to view and test how Apple may process Your Bitcode into machine code binary form.”).

<sup>62</sup> Apple provides guidance for developers on how to protect their users’ data. See Apple Developer, “Protecting the User’s Privacy,” available at [https://developer.apple.com/documentation/uikit/protecting\\_the\\_user\\_s\\_privacy](https://developer.apple.com/documentation/uikit/protecting_the_user_s_privacy), accessed on February 14, 2021.

<sup>63</sup> Apple Developer, “Promoting your apps,” available at <https://developer.apple.com/app-store/promote/>, accessed on February 14, 2021; Apple Developer, “Membership Details,” available at <https://developer.apple.com/programs/whats-included/>, accessed on February 14, 2021 (“Technical Support: Request code-level support from technical support engineers who can help troubleshoot your app’s code or provide solutions that will fast-track your development.”).

<sup>64</sup> Apple Developer, “Membership Details,” available at <https://developer.apple.com/programs/whats-included/>, accessed on February 14, 2021 (“Distribution, App Store, The App Store makes it easy for over a billion customers on iPhone, iPad, Mac, Apple TV, and Apple Watch to discover and download your apps, games, and sticker packs.” “Apple Pay: Accept payments for goods and services in your apps and on the web.”).

rejected in Apple's review.<sup>65</sup> Apple also offers the Apple Developer Enterprise Program for large organizations that would like to develop and deploy proprietary, internal-use apps to their employees. Developers agree to pay \$299 to participate in this program.<sup>66</sup>

55. Apple does not charge any fee to consumers who use the App Store. The App Store allows consumers to find, evaluate, purchase, and maintain apps on their iOS devices with no charge from Apple (rather, the developer may choose to charge the consumer a price for the app or in-app purchase).<sup>67</sup> The App Store allows consumers to re-download apps across all of their iOS devices, facilitates the downloading of any app updates created by a developer over the lifetime of the app, and allows consumers to manage all their mobile subscriptions from one screen in the settings of their iOS device, all free of charge.<sup>68</sup> In addition, Apple's free family sharing program allows up to six family members to jointly use their App Store purchases on all family devices. It also allows parents to set parental controls for app use and purchases made by children.<sup>69</sup>

### ***5.3. App Developers on the App Store***

56. Over one million app developers have made either free or paid transactions (i.e., "transactions")<sup>70</sup> with consumers through the U.S. storefront of the App Store since June 4, 2015, the start of the developer class period.<sup>71</sup> In particular, approximately [REDACTED] developers have at least one recorded original App Store transaction (i.e., had a free or paid app download or in-app purchase transaction) through the App Store from June 4, 2015

<sup>65</sup> Apple Developer, "App Review," available at <https://developer.apple.com/app-store/review/>, accessed on February 8, 2021 ("On average, 50% of apps are reviewed in 24 hours and over 90% are reviewed in 48 hours. If your submission is incomplete, review times may be further delayed or your app may be rejected."); Reporter's Transcript of Proceedings, *Epic Games Inc. v. Apple, Inc.*, May 3, 2021, ("Epic Trial Testimony"), Epic Trial Testimony of Trystan Kosmyinka (Apple), p. 1110 ("Our goal and our promise that we've made to developers is that we complete a review for your app -- 50 percent of apps within 24 hours... 50 percent in 24 hours, 90 percent within 48 hours.").

<sup>66</sup> Apple Developer, "Apple Developer Enterprise Program," available at <https://developer.apple.com/programs/enterprise/>, accessed on July 26, 2021 ("The Apple Developer Enterprise Program allows large organizations to develop and deploy proprietary, internal-use apps to their employees. This program is for specific use cases that require private distribution directly to employees using secure internal systems or through a Mobile Device Management solution... The Apple Developer Enterprise Program is 299 USD per membership year or in local currency where available.").

<sup>67</sup> Apple allows developers to choose whether to charge a price or have in-app purchases, as implied by the guidance available for developers to select a business model. Apple Developer, "Choosing a business model," Apple Developer, Available at <https://developer.apple.com/app-store/business-models/>. Accessed August 5th 2021.

<sup>68</sup> Apple, "Redownload apps and games from Apple," available at <https://support.apple.com/en-us/HT211841>, accessed on February 8, 2021; Apple, "Change your subscription from Apple," available at <https://support.apple.com/en-us/HT204939>, accessed on February 13, 2021.

<sup>69</sup> Apple, "Family Sharing," available at <https://www.apple.com/family-sharing/>, accessed on July 26, 2021.

<sup>70</sup> The "product" that Apple jointly provides developers and consumers is transactions that facilitate the exchange of content, including downloads, updates, in-app purchases.

<sup>71</sup> Developer Motion for Class Action, p. 1.



through April 25, 2021 (the last date in the data available to me).<sup>72</sup> The developer class proposed by the developer Plaintiffs (and adopted by Professor Elhauge and Professor Economides) is a small fraction of this number. The developer class complaint focuses only on U.S. developers that have at least one paid app download or paid in-app purchase transaction during the class period.<sup>73</sup> Applying this definition results in [REDACTED] developers in the proposed class.<sup>74</sup> In other words, the proposed developer class consists of only [REDACTED] percent of all developers that have transacted with consumers through the U.S. App Store storefront during the developer class period.<sup>75</sup> (I use the term “proposed developer class member” when discussing app developers that are part of the proposed developer class, and I use the more general term “developers” when discussing all developers, including developers that are not in the proposed class.) These proposed developer class members have generated for themselves, through paid transactions with consumers through the App Store, approximately [REDACTED] in post-commission developer revenues from June 4, 2015 through April 25, 2021.<sup>76</sup>

**FIGURE 4**  
***Proposed developer class members***

Developer Type	Developers	
		Percentage
1. Total	[REDACTED]	
2. Transaction in Class Period		
3. Positive Commission in Class Period		
4. Proposed Class		

Source: Apple Transaction Data

Note: Apple developers are excluded based on Professor Economides’ identification methodology. There are five developers in the proposed developer class without an original transaction during the class period but with positive commissions; I included these to be consistent with Professor Economides’ determination of proposed developer class members. Additionally, one developer with content\_provider\_id “-1” is excluded. The “Proposed Class” restricts to U.S. developers. See Appendix F for details regarding Apple transaction data processing.

<sup>72</sup> I identify proposed developer class members in the Apple transaction data using Professor Economides’ methodology. See my workpapers.

<sup>73</sup> Developer Motion for Class Action, p. 1; Expert Class Certification Report of Professor Einer Elhauge, June 1, 2021 (“Elhauge Report”), ¶ 1 (“I understand that Plaintiffs have moved to certify a class defined as: ‘All U.S. developers of any Apple iOS application or in-app product (including subscriptions) sold for a non-zero price via Apple’s iOS App Store at any time on or after June 4, 2015.’”); Expert Class Certification Report of Professor Nicholas Economides, June 1, 2021, (“Economides Report”), ¶ 7 (“The class in the present action is defined as ‘All U.S. developers of any Apple iOS application or in-app product (including subscriptions) sold for a non-zero price via Apple’s iOS App Store at any time on or after June 4, 2015.’”).

<sup>74</sup> Professor Economides calculates 59,420 developers in the proposed developer class using data from June 4, 2015 to September 30, 2019. See Economides Report, ¶ 72. My analyses include additional data through April 25, 2021. See my workpapers.

<sup>75</sup> See my workpapers.

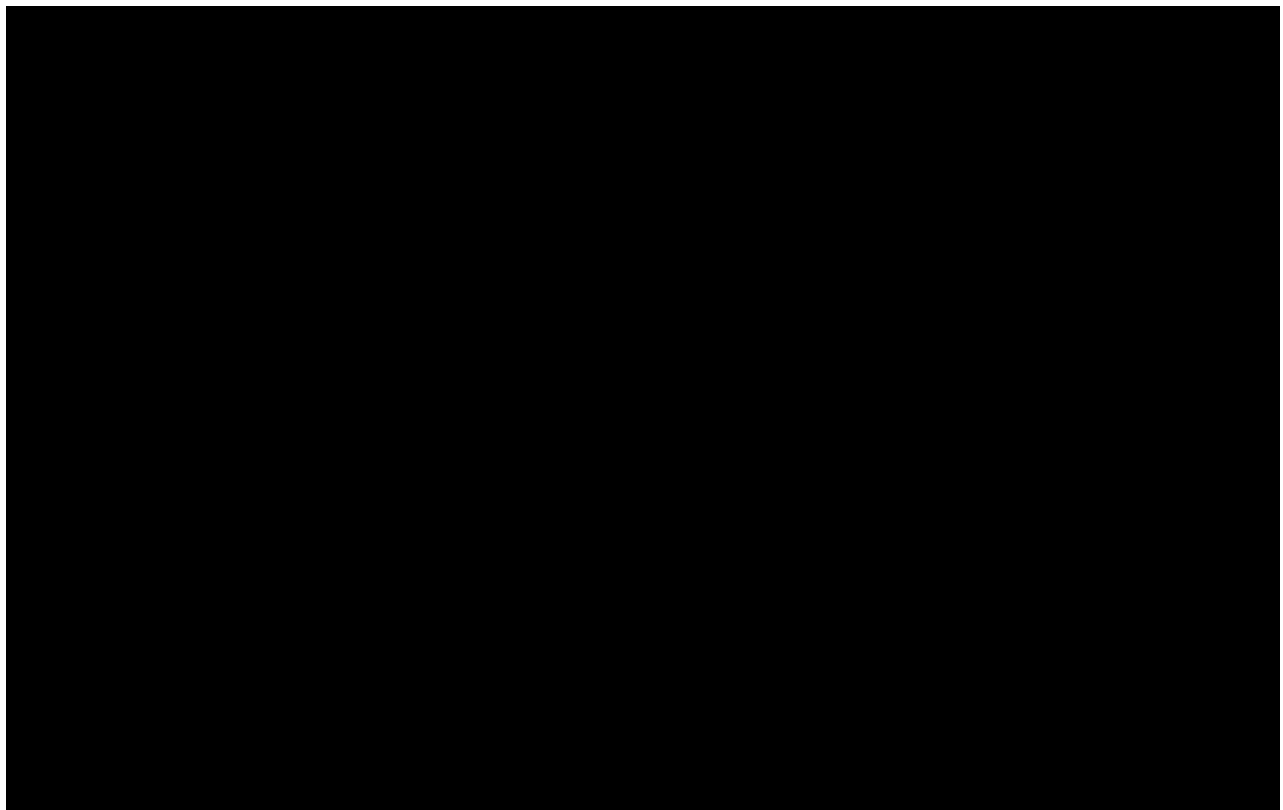
<sup>76</sup> See my workpapers. Note that all developers on the App Store collectively generated \$56.9 billion in post-commission revenues through the App Store.

57. A developer can choose to classify each app it offers on the App Store into one of 27 app genres. Figure 5 shows the number of proposed developer-class members that offered an app with at least one download transaction in an app genre during the class period. Over [REDACTED] developers, or approximately [REDACTED] percent of proposed developer class members offered a game app through the App Store, the category with the highest number of unique developers on the App Store during the class period.<sup>77</sup> Other genres in which a large number of developers have offered apps include Education, Entertainment, Utilities, Lifestyle, and Health & Fitness. Beyond these top app genres, app developers offer apps in a wide range of other, less common genres, including Weather, Shopping, and Finance.

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**FIGURE 5**

*Number of unique proposed class developers that released apps in each genre (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only original transactions from downloads are included. Data is limited to apps and developers with at least one app download, for a total of [REDACTED] in the class. Developers may be placed into multiple genres. [REDACTED] apps are associated with multiple content\_provider\_ids. Only developers in the proposed class are included. See Appendix F for details regarding Apple transaction data processing.

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58. Proposed developer class members range from individuals, such as Named Plaintiff Cameron, who have developed a single iOS app with relatively few downloads, to large

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<sup>77</sup> See my workpapers.



firms, such as Google, which offer a large number of apps that have each been downloaded on millions of occasions.<sup>78</sup> Figure 6 shows that the number of apps offered by any given developer varies significantly. About [REDACTED] percent of proposed developer class members, such as Named Plaintiff Cameron, offer only one app. Other proposed developer class members offer just two or three apps, often with related purposes. For example, the developer Double Down Interactive offers three apps, all of which are casino games.<sup>79</sup> On the other hand, nearly [REDACTED] percent of proposed developer class members offer 20 or more apps and often offer apps that serve a wide variety of purposes. [REDACTED] the largest app developer on the App Store by total revenues through the App Store [REDACTED]

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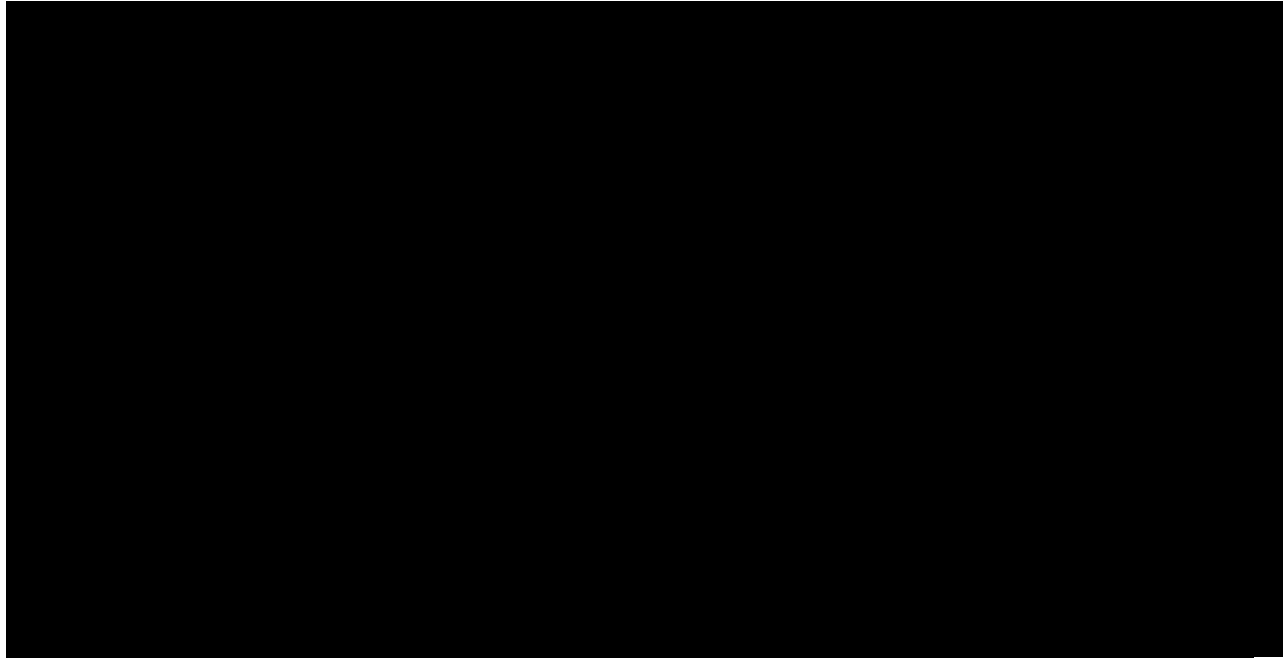
<sup>78</sup> The app “Lil’ Baby Names” was only downloaded 50 times. See my workpapers.

<sup>79</sup> Apple, “App Store Preview: Double Down Interactive LLC,” available at <https://apps.apple.com/us/developer/double-down-interactive-llc/id485126027>, accessed on July 28, 2021. As of July 28, 2021 Double Down Interactive offered three apps on the App Store. See my workpapers.

<sup>80</sup> Apple, “App Store Preview: Google LLC,” available at <https://apps.apple.com/us/developer/google-llc/id281956209>, accessed on July 28, 2021. From June 4, 2015 through April 25, 2021, Google’s largest revenue generating apps were YouTube, YouTube Music, YouTube TV, and Google Photos. 84% of YouTube’s revenue is through subscription in-app purchases and the remaining 16% is through non-subscription in-app purchases. 100% of revenue from YouTube Music, YouTube TV, and Google Photos are through subscription in-app purchases. See my workpapers.

**FIGURE 6**

*Distribution of proposed class developers by number of apps transacted through the App Store (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

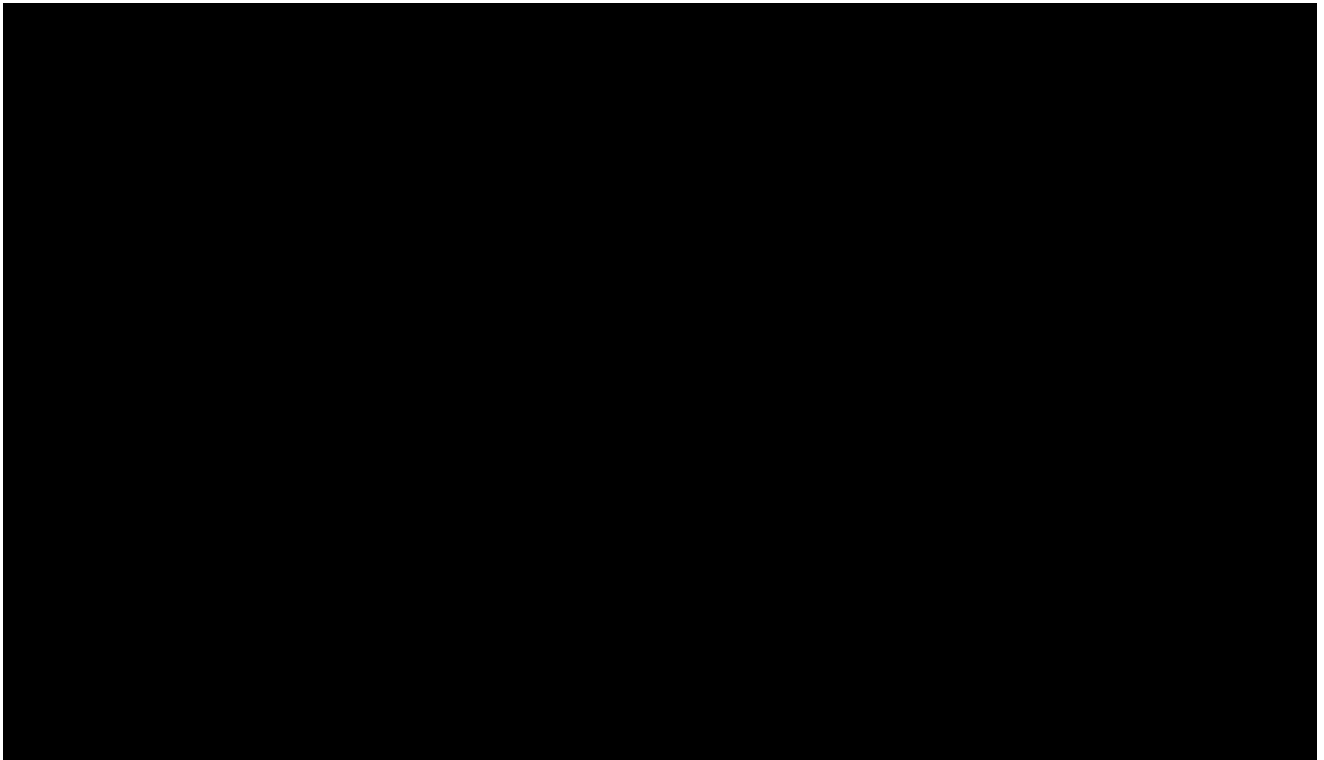
Note: Only original transactions from downloads are included. Only developers in the proposed class are included. Data is limited to apps and developers with at least one app download, for a total of [REDACTED] in the proposed developer class. [REDACTED] apps are associated with multiple content\_provider\_ids. See Appendix F for details regarding Apple transaction data processing.

59. Figure 7 shows the distribution of total initial downloads per proposed developer class member through the App Store. [REDACTED] of proposed developer class members had relatively modest numbers of download transactions (i.e., between 100 and 9,999 downloads) over the class period. A significant number of proposed developer class members, approximately [REDACTED] percent, had *fewer* than 100 initial app-downloads during the class period, across all apps they offered. [REDACTED] members of the proposed developer class had less than 10 downloads through the App Store during this period while [REDACTED] proposed class developers had at least 10 but less than 100 downloads through the App Store during this period. At the other extreme, some proposed developer class members had millions of initial app downloads during the class period across all apps offered, with [REDACTED] proposed developer class members each having over 100 million initial app downloads over the nearly six years of data.<sup>81</sup>

<sup>81</sup> These developers include Google, Amazon, Microsoft, Facebook, Lion Studios, Instagram, Disney, Adobe, Snap, TikTok, and Netflix. See my workpapers.

**FIGURE 7**

*Distribution of proposed class developers by total app downloads through the App Store (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only developers in the proposed class are included. Only original transactions from downloads are included. Numbers represent the count of developers in each bar. Data is limited to developers with at least one download during the class period, for a total of [REDACTED] in the proposed class. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

60. In addition, proposed developer class members differ in whether they offer digital in-app purchases to consumers. Figure 8 shows that almost half (i.e., [REDACTED] percent) of proposed developer class members have no in-app purchase transactions, and an additional [REDACTED] percent have made fewer than 100 in-app transactions with consumers over the entire class period.<sup>82</sup> In contrast, a small number of individual developers [REDACTED] proposed developer class members) each had at least 10 million in-app purchase transactions.<sup>83</sup> The in-app purchase transactions for these [REDACTED] developers represent [REDACTED] percent of all in-app purchase transactions from proposed developer class members during the developer class period.<sup>84</sup>

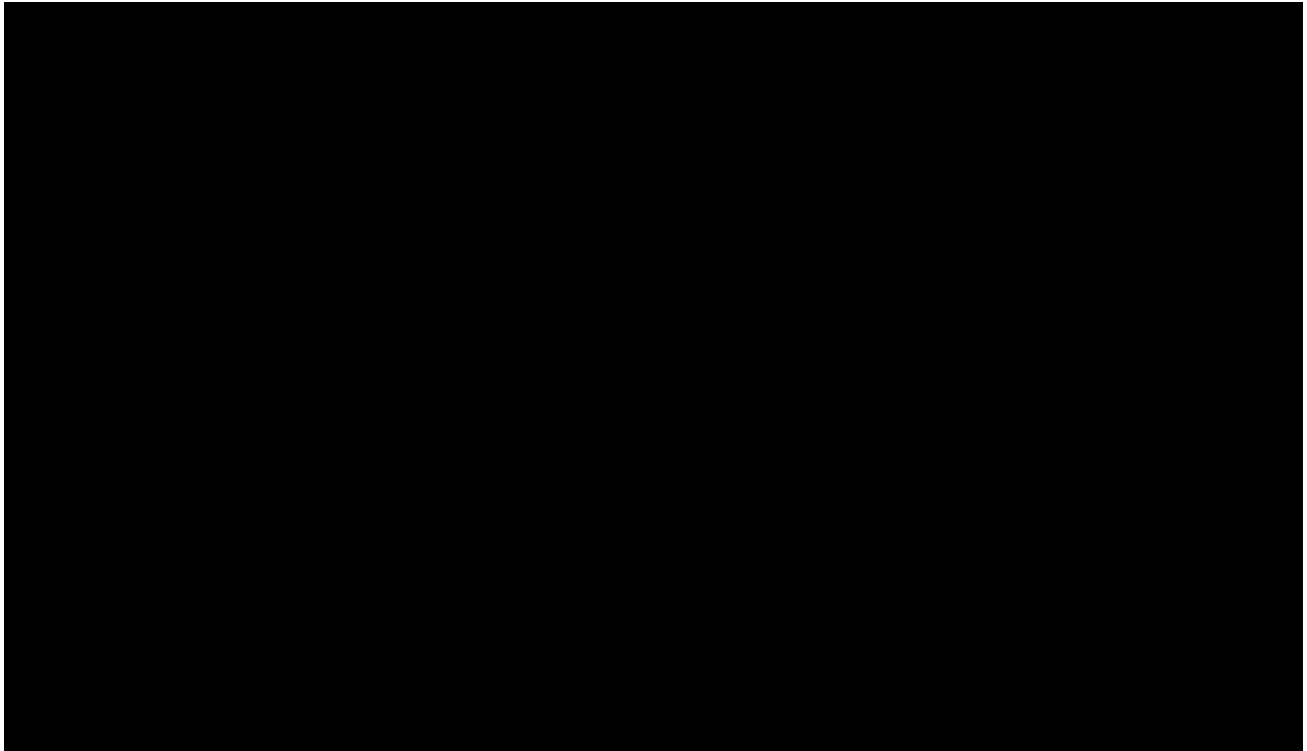
<sup>82</sup> Examples of developers with less than 100 in-app purchase transactions include Slack Technologies, Inc., Kayak Software Corp, and PeopleFun CG, LLC. See my workpapers.

<sup>83</sup> Examples of these developers with more than 10 million in-app purchase transactions include Roblox Corporation, Pandora Media, Inc., and Google LLC. See my workpapers.

<sup>84</sup> See my workpapers.

**FIGURE 8**

*Distribution of proposed class developers by number of total in-app purchases through the App Store (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only developers in the proposed class are included. Only original transactions from in-app purchases are included. Numbers represent the count of developers in each bar. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

61. Each developer (whether in the proposed class or not) must make a choice regarding how to monetize each app it offers through the App Store. For example, a developer must choose whether the initial app download is free or paid, what functionalities will be available to consumers for free after the download and what functionality will require an additional payment, how and where the consumers will pay (within the app or through other channels), and what price consumers will pay, subject to minimal guidelines (e.g., in the App Store the lowest price for a paid app is \$0.99).<sup>85</sup>

<sup>85</sup> Equinix, “A better App Store Pricing Matrix,” January 24, 2019, available at <https://www.equinix.com/us/appdevelopers/pricematrix.html>, accessed on February 8, 2021; Deposition of Philip Schiller (Apple), Volume I, February 11, 2021, pp. 374–375 (“A. Yes. The pricing started at 99 cents and then went up by one dollar increments. Q. Well, technically it started at zero, right, you could charge -- A. Thank you. I should be the one saying at that. I appreciate at that. Yes. There were many, many apps that were zero. Thank you. Q. But at the time you could either give an app away for free, or if you charged something for it, it had to end in 99 cents, right? A. Yes.”); Deposition of Eddy Cue (Senior Vice President of Internet Services and Software, Apple), February 8, 2021, p. 250 (“The apps -- the developers decide what price. And what we've done is created a bunch of what we call ‘magic price points,’ things that generally end in 99 cents, if we're speaking of it in U.S. currency. But -- and so you could price it at 99 cents,

62. How a developer chooses to monetize will have a direct impact on what commissions, if any, the developer pays Apple in order to transact with consumers. Some apps, such as Mojang's Minecraft,<sup>86</sup> charge for an initial download and for upgraded content. Others, such as King's Candy Crush Saga or Rovio's Angry Birds,<sup>87</sup> are free to download but generate revenue through the purchase of in-game currency or digital content through in-app payment. Facebook generates "substantially all" of its revenue from advertising; advertising on Facebook's iOS app is not subject to an Apple commission.<sup>88</sup> The Weather Channel app is free to download on multiple app marketplaces and is ad-supported; users can purchase subscriptions that remove ads and provide more features.<sup>89</sup> Netflix and Spotify are free to download on the App Store and also offer subscriptions to their users; however, those developers currently only allow users to sign-up for these subscriptions outside of the iOS app, avoiding any Apple commission.<sup>90</sup>

63. Some developers choose to combine different monetization methods for their apps. For example, Microsoft monetizes its Solitaire Collection using ads, in-app subscriptions that both remove ads and add other features, and one-off purchases for game enhancements.<sup>91</sup> Developers can also choose to change monetization models for their apps at any time. For example, YouTube started to allow consumers to remove ads via a subscription starting in

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1.99, 2.99, et cetera. Q So as a general matter, the developers are required to price their apps at those increments? A That's right. They pick from that list.”).

<sup>86</sup> Apple, “App Store Preview: Minecraft,” available at <https://apps.apple.com/us/app/minecraft/id479516143>, accessed on February 14, 2021.

<sup>87</sup> Apple, “App Store Preview: Candy Crush Saga,” available at <https://apps.apple.com/us/app/candy-crush-saga/id553834731>, accessed on February 14, 2021; Google Play, “Angry Birds Classic,” available at [https://play.google.com/store/apps/details?id=com.rovio.angrybirds&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.rovio.angrybirds&hl=en_US&gl=US), accessed on February 14, 2021.

<sup>88</sup> Facebook, Inc., SEC Form 10-K for period ended December 31, 2020, filed on January 28, 2021, p. 7 (“We generate substantially all of our revenue from selling advertising placements to marketers.”).

<sup>89</sup> Amazon, “The Weather Channel: Forecast, Radar & Alerts,” available at [https://www.amazon.com/Weather-Channel-Forecast-Radar-Alerts/dp/B0064X7FVE/ref=sr\\_1\\_1](https://www.amazon.com/Weather-Channel-Forecast-Radar-Alerts/dp/B0064X7FVE/ref=sr_1_1), accessed on February 13, 2021; Apple, “App Store Preview: Weather – The Weather Channel,” available at <https://apps.apple.com/us/app/weather-the-weather-channel/id295646461>, accessed on February 13, 2021 (“Subscriptions: Premium Pro Annual: Ad free. Enhanced radar.”); Google Play, “Weather Radar & Live Widget: The Weather Channel,” available at [https://play.google.com/store/apps/details?id=com.weather.Weather&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.weather.Weather&hl=en_US&gl=US), accessed on February 13, 2021 (“Upgrade to The Weather Channel Premium for our most comprehensive, dynamic, and precise weather experience available. Get exclusive access to:- Ad-free weather...and more.”); Samsung Galaxy Store, “The Weather Channel for Samsung,” available at <http://galaxystore.samsung.com/detail/com.weather.samsung>, accessed on February 13, 2021.

<sup>90</sup> Chris Welch, “Netflix stops offering in-app subscriptions for new and returning customers on iOS,” *The Verge*, December 28, 2018, available at <https://www.theverge.com/2018/12/28/18159373/netflix-in-app-subscriptions-iphone-ipad-ios-apple>, accessed on February 5, 2021 (“Now, customers will have to begin a subscription through a web browser such as Safari...Spotify, the leading subscription music app, has also bypassed Apple’s in-app billing for similar reasons.”).

<sup>91</sup> Apple, “Microsoft Solitaire Collection on the App Store,” available at <https://apps.apple.com/us/app/microsoft-solitaire-collection/id1103438575>, accessed on August 5, 2021; Google Play, “Microsoft Solitaire Collection – Apps on Google Play,” available at [https://play.google.com/store/apps/details?id=com.microsoft.microsoftsolitairecollection&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.microsoft.microsoftsolitairecollection&hl=en_US&gl=US), accessed on August 7, 2021.

2015, and Pocket God: Ooga Jump switched from a paid app model to a “freemium” model (i.e., initially free app with an upgrade available via an in-app purchase) in 2013.<sup>92</sup>

64. In addition, the commissions a given developer ultimately pays to Apple for a given app can be affected by platform policies Apple has implemented that are not common across apps. Apple requires that most iOS app developers who sell digital goods or services outside the App Store for use on iOS devices also allow consumers the option to make such purchases within the iOS app. There are exceptions for certain apps; for example, Apple does not require developers of “reader apps” (namely magazines, newspapers, books, audio, music, and video apps) to offer their paid content for sale within the iOS app.<sup>93</sup> If also offered within the iOS app, developers are free to choose different prices for transactions for the same iOS content selling within the app, and through other avenues outside of the App Store. Some developers may choose lower prices (as is done by companies such as TIDAL and Google) when charging consumers directly through their websites than when on third-party platforms that charge commissions, while others may not.<sup>94</sup> Apple does not place any restrictions on the relative pricing the developer offers between in-app purchases made through the App Store and those made through other avenues.<sup>95</sup> However, within the iOS app, developers choose the price that consumers pay to transact with them for each of their

<sup>92</sup> Josh Constine, “YouTube Red, A \$9.99 Site-Wide Ad-Free Subscription With Play Music, Launches Oct 28,” *Tech Crunch*, October 21, 2015, available at <https://techcrunch.com/2015/10/21/youtube-red/>, accessed on August 5, 2021; Aldrin Calimlim, “Pocket God: Ooga Jump Makes The Leap To The Freemium Side With Latest Update,” *AppAdvice*, December 12, 2013, available at <https://appadvice.com/appnn/2013/12/pocket-god-ooga-jump-makes-the-leap-to-the-freemium-side-with-latest-update>, accessed on August 2, 2021.

<sup>93</sup> App Store Review Guidelines, 3.1.3(a) (“Reader” Apps: Apps may allow a user to access previously purchased content or content subscriptions (specifically: magazines, newspapers, books, audio, music, and video).”); Deposition of Carson Oliver (Director of Business Management, Apple App Store), January 26, 2021, pp. 85–86, 93 (“The Reader Rule allows for digital goods and services to be consumed within apps that are purchased outside of those apps... If a user purchases the digital good and service outside of the app, and that can be on their iOS device outside of the app, for example, on Web, Apple would not take a commission on that sale of that digital good or service, even when it is consumed within the app... The Reader Rule does not require that digital good or service is made available to users for purchase within an app or game.”).

<sup>94</sup> TIDAL charges \$12.99 for its monthly TIDAL premium service on the App Store and \$9.99 for the same service on its own website. Google charges \$12.99 for its monthly YouTube Music Premium subscription on the App Store and \$9.99 for the same service on its own website. See Apple, “App Store Preview: TIDAL Music,” available at <https://apps.apple.com/us/app/tidal-music/id913943275> and TIDAL, “Home,” available at <https://tidal.com/>. Google charges \$12.99 for its monthly YouTube Music Premium subscription on the App Store and \$9.99 for the same service on its own website. See Apple, “App Store Preview: YouTube Music,” available at <https://apps.apple.com/us/app/youtube-music/id1017492454>; and YouTube, “YouTube Music,” available at <https://www.youtube.com/musicpremium>.

<sup>95</sup> Deposition of Matthew Fischer (Apple), Volume II, January 7, 2020, pp. 341–342 (“Q. You’re aware of instances where apps have one price in the App Store and a different price on another platform? A. Yes, I’m aware of instances of that. Q. Do you have any policies in place to prohibit developers from charging a different price on the App Store than on any other platform, like a most favored nations price or something like that? A. No, none whatsoever. They can charge whatever they would like on our platform. It can be a different price, you know, a higher price or a lower price, that’s completely up to the discretion of the developer.”).

apps and in-app purchases from a variety of price tiers ending in 99 cents (i.e., \$0.99, \$1.99, \$2.99, etc.) up to \$999.99.<sup>96</sup>

65. Because developers are free to make paid transactions with consumers outside of the App Store for content used in iOS apps, each developer has a choice to make regarding whether and how to make this available to iOS consumers. Some developers, for some apps, may choose to make all their paid transactions with iOS consumers through the App Store; some may make a portion of their paid transactions with iOS consumers through the App Store and a portion outside, at the same price in the App Store and outside the App Store or at different prices in the App Store and outside the App Store; and finally some may make all their paid transactions with iOS consumers outside the App Store (as Spotify and Netflix currently do).<sup>97</sup>

66. Further, the monetization method used within the App Store is highly individualized, sometimes even across apps offered by the same developer. Proposed developer class members, all of whom had at least one app that had one or more paid transactions through the App Store, often also offer free apps that do not monetize through the App Store; in particular, I find that 43.9 percent of proposed developer class members had at least one app that only had free transactions.<sup>98</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

<sup>96</sup> Deposition of Matthew Fischer (Apple), Vol. 2, pp. 259, 261 (“We give them a set of a wide, wide, wide range of different price tiers that they can -- that they can select from. [...] Q. Okay. And a developer can pick zero, right? A. Yes, and most of them do. Q. Or 99, right? A. Or 1.99 or 2.99 or 3.99 and all the way up to \$999.99.”). Between January 1, 2015 and April 25, 2021, the median app had an average paid download price of \$1.99 and the median paid in-app purchase had an average price of \$3.99. See my workpapers.

<sup>97</sup> Chris Welch, “Netflix stops offering in-app subscriptions for new and returning customers on iOS,” The Verge, December 28, 2018, available at <https://www.theverge.com/2018/12/28/18159373/netflix-in-app-subscriptions-iphone-ipad-ios-apple>, accessed on February 5, 2021 (“Now, customers will have to begin a subscription through a web browser such as Safari...Spotify, the leading subscription music app, has also bypassed Apple’s in-app billing for similar reasons.”).

<sup>98</sup> See my workpapers.

<sup>99</sup> Match Group, “Our Company,” available at <https://mtch.com/ourcompany>, accessed on August 3, 2021

<sup>100</sup> Apple App Store, “Our Time,” available at <https://apps.apple.com/us/app/ourtime-meet-50-singles/id1009499048>, accessed on August 3, 2021.

[REDACTED]

[REDACTED]

67. While I have received some data from individual developers that have been produced in this matter, systematic data do not exist for each app to exhibit the proportion of revenue that each developer earns from transactions with iOS consumers through the App Store versus revenue earned through transactions with those same consumers outside of the App Store, nor other consumers. That said, the App Store transaction data do show that developers vary greatly in the dollar amount of revenue they transact through the App Store for their apps. Figure 10 shows the wide distribution across proposed developer class members of total App Store billings from paid downloads and in-app purchases during the developer class period. A large portion of proposed developer class members, who by definition have at least some revenues through the App Store, earn minimal revenue with transactions through the App Store. Nearly [REDACTED] percent of proposed developer class members have less than \$10 in total

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<sup>101</sup> Apple App Store, “Plenty of Fish,” available at <https://apps.apple.com/us/app/plenty-of-fish-dating/id389638243>, accessed on August 3, 2021.

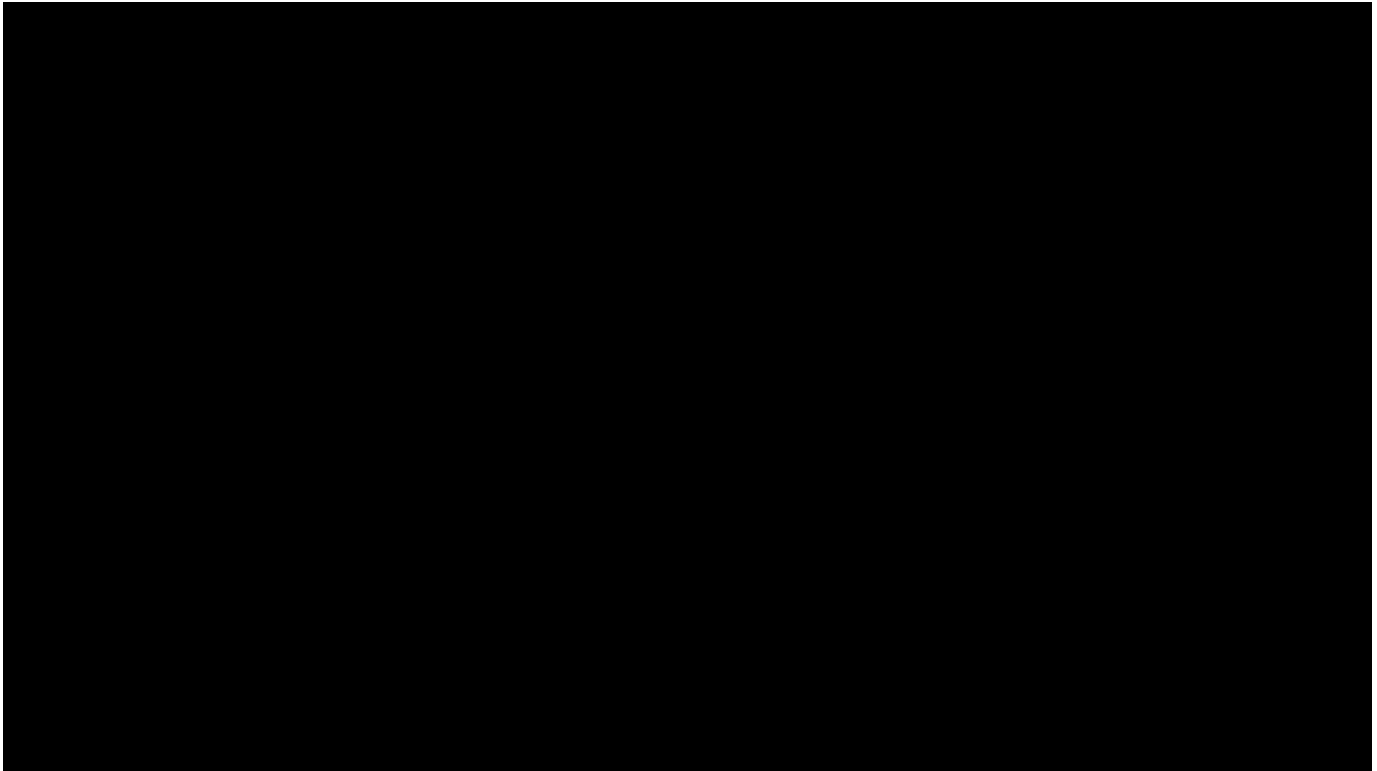


billings through the App Store over the nearly six years of the developer class period covered by the data, and another [REDACTED] percent have at least \$10 but less than \$100 in total billings through the App Store over this time frame.<sup>102</sup> On the other extreme [REDACTED] proposed developer class members generated more than \$100 million in total billings on the App Store, accounting for [REDACTED] percent of total App Store revenue from proposed developer class members over the developer class period.<sup>103</sup>

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**FIGURE 10**

*Distribution of proposed class developers by total billings through the App Store (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only developers in the proposed class are included. Four developers with non-positive billings are excluded. Numbers represent the count of developers in each bar. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

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68. Developers who monetize their app through the App Store use different monetization models. Figure 11 shows the proportion of developers with billings from only paid downloads, only from in-app purchases, or from both. As the exhibit shows, [REDACTED] percent of

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<sup>102</sup> Some developers with minimal revenues but a large number of downloads may be anomalies and may not in fact generate App Store revenue though paid downloads or digital in-app purchases. For example, Ticketmaster, which had over 26 million downloads over the class period and does not list any in-app purchases on its App Store page, generated less than \$100 in developer revenues on the App Store during this period. See my workpapers. Apple App Store, “Ticketmaster –Buy, Sell Tickets,” available at <https://apps.apple.com/us/app/ticketmaster-buy-sell-tickets/id500003565>, accessed on August 10, 2021.

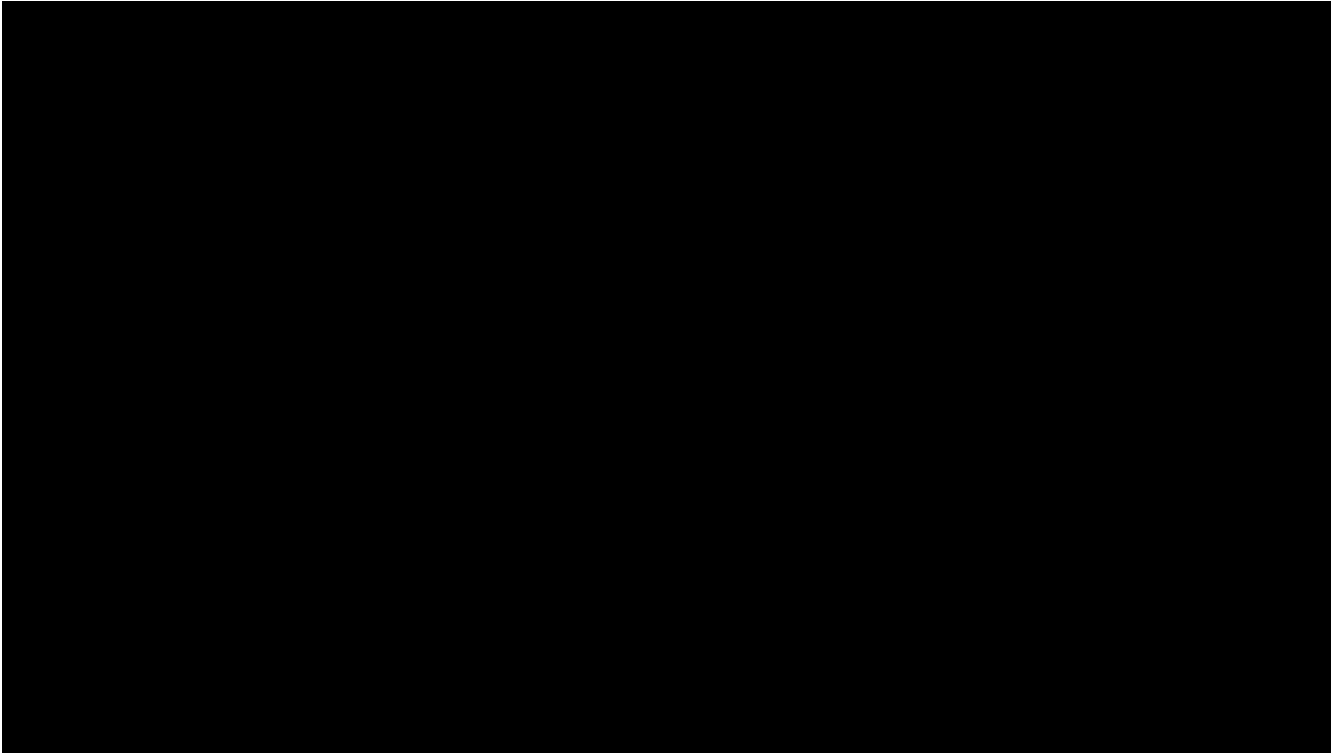
<sup>103</sup> See my workpapers.

proposed developer class members have monetized through the App Store entirely using in-app purchases while [REDACTED] percent have monetized through the App Store solely using paid downloads; the remaining [REDACTED] percent use a mix of in-app purchases and paid downloads.

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**FIGURE 11**

*Share of proposed class developers with billings from paid downloads or in-app purchases (June 4, 2015 – April 25, 2021)*

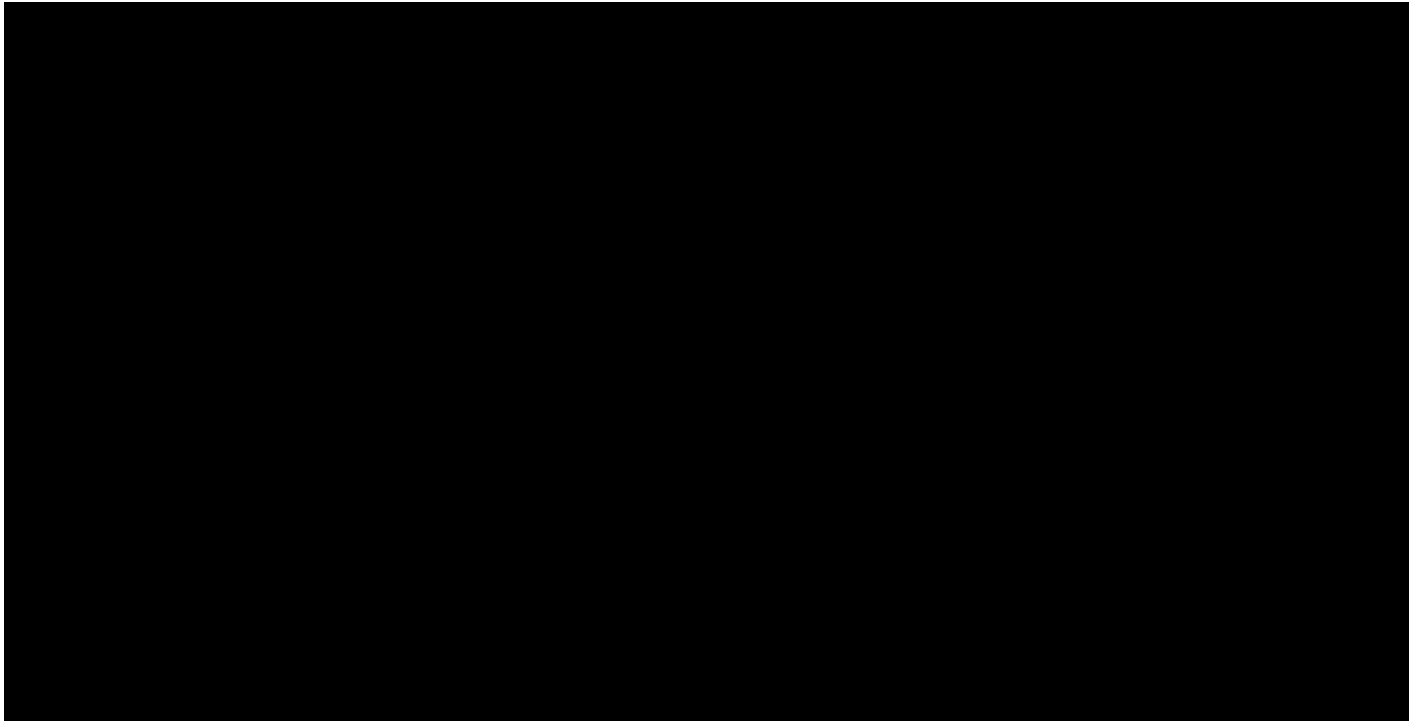


Source: Apple Transaction Data

Note: Only developers in the proposed class are included. Four developers are excluded due to a non-positive billing amount across both app downloads and in-app purchases. If a developer has a positive total billing amount, but negative billing for either app downloads or in-app purchases, the billing amount for that revenue type is treated as zero. See Appendix F for details regarding Apple transaction data processing.

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69. Developers that monetize through digital in-app purchases can also choose whether to monetize through offering subscription or non-subscription purchases. Adoption of these two types of in-app purchases varies across proposed developer class members. Figure 12 shows the proportion of developers that generate in-app purchase revenue only from subscription in-app purchases, only from non-subscription in-app purchases, or from both. [REDACTED] percent of the developers who use in-app purchases as a monetization method rely only on non-subscriptions. [REDACTED] percent rely only on subscription in-app purchases, and the remaining [REDACTED] percent use a mix of both.

**FIGURE 12*****Share of proposed class developers by in-app billings types (June 4, 2015 – April 25, 2021)***

Source: Apple Transaction Data

Note: Only developers in the proposed class are included. 141 developers with at least one in-app purchase are excluded due to a non-positive billing amount across both in-app purchase types. If a developer has a positive total in-app purchase billing amount, but negative billing amount for subscription or non-subscription in-app purchases, the billing amount for that in-app purchase type is treated as zero. See Appendix F for details regarding Apple transaction data processing.

**5.4. Consumers on the App Store**

70. Millions of consumers have transacted through the App Store. While the App Store transaction data available in this matter do not identify individuals, they do identify unique consumer accounts.<sup>104</sup> Given the data available, I analyze consumer accounts throughout this report. According to the App Store transaction data, there are approximately [REDACTED] consumer accounts that have made a free or paid transaction through the U.S. storefront of the App Store (i.e., downloaded an app or made a digital in-app purchase) from its inception, July 10, 2008, through April 25, 2021. Of these, [REDACTED] consumer accounts have had at

<sup>104</sup> In his deposition, Professor McFadden recognized that there is no practical way to connect accounts to a single individual or a single family. McFadden Deposition, p. 227:4-24 (“Q. If there are consumers who have multiple Apple IDs, isn’t a fact that you will be unable to determine whether those consumers are injured unless you net out all the transactions carried out by the total set of their IDs? ... THE DEPONENT: The answer is that the calculation has to be done by Apple ID because the transactions database does -- does not tell you anything about whether different Apple IDs are associated with a single person or not. There is -- there -- and -- and as far as I know, Apple itself would not know whether separate Apple IDs are coming from the same person or not. So that I think that it is beyond the reach of Apple or the plaintiffs to -- to -- to try to -- to try to merge Apple IDs attached to a single individual or to a single family, or to a single payer. That might be the economic ideal, but I think that is beyond the bounds of practically.”)

least one paid download or digital in-app purchase and thus are accounts that would be associated with the proposed consumer class as defined by the consumer class complaint.<sup>105</sup> Thus, the majority of consumer accounts, [REDACTED] percent, have made no paid transactions with developers through the U.S. App Store storefront. Only [REDACTED] percent of all consumer accounts have made paid transactions and thus would be connected to the proposed consumer class. (I refer to these consumer accounts as “proposed class consumer accounts” and I refer to consumers that are in the proposed consumer class as “proposed consumer class members”). These proposed class consumer accounts have collectively spent [REDACTED] through the App Store.<sup>106</sup>

71. Proposed class consumer accounts differ in the number of apps for which they have made a payment through the App Store. Figure 13 shows that [REDACTED] percent of proposed class consumer accounts have only made a paid transaction for one app. In addition, [REDACTED] of proposed class consumer accounts have paid transactions for fewer than 20 apps, while [REDACTED] percent of proposed class consumer accounts have made paid transactions for equal to or more than 50 apps.

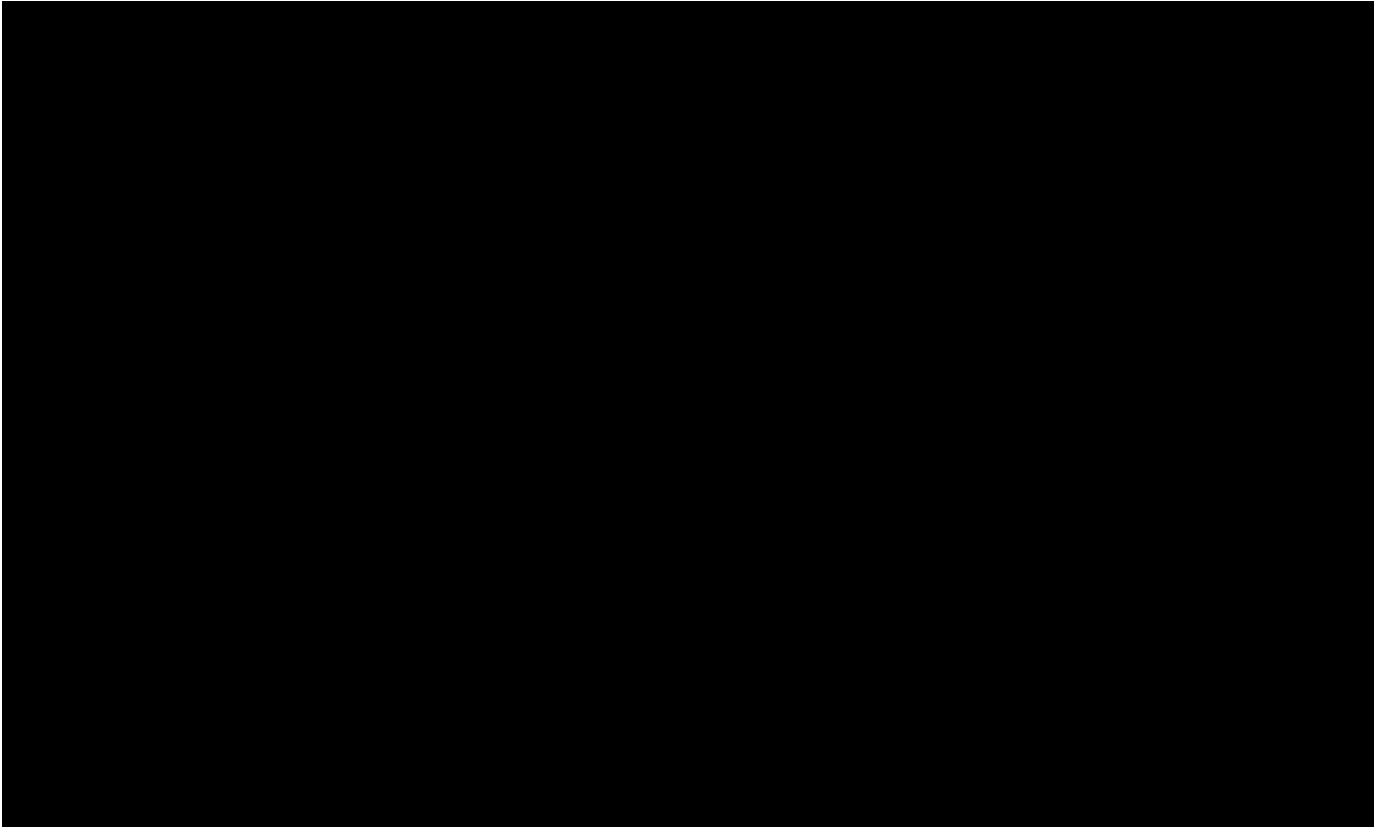
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<sup>105</sup> To account for refunds, I aggregate the total App Store spending of each account and limit the proposed consumer class accounts to only the accounts with positive spend. See my workpapers.

<sup>106</sup> See my workpapers.

**FIGURE 13**

*Distribution of proposed consumer accounts by the number of apps with payment each account used (July 10, 2008 – April 25, 2021)*



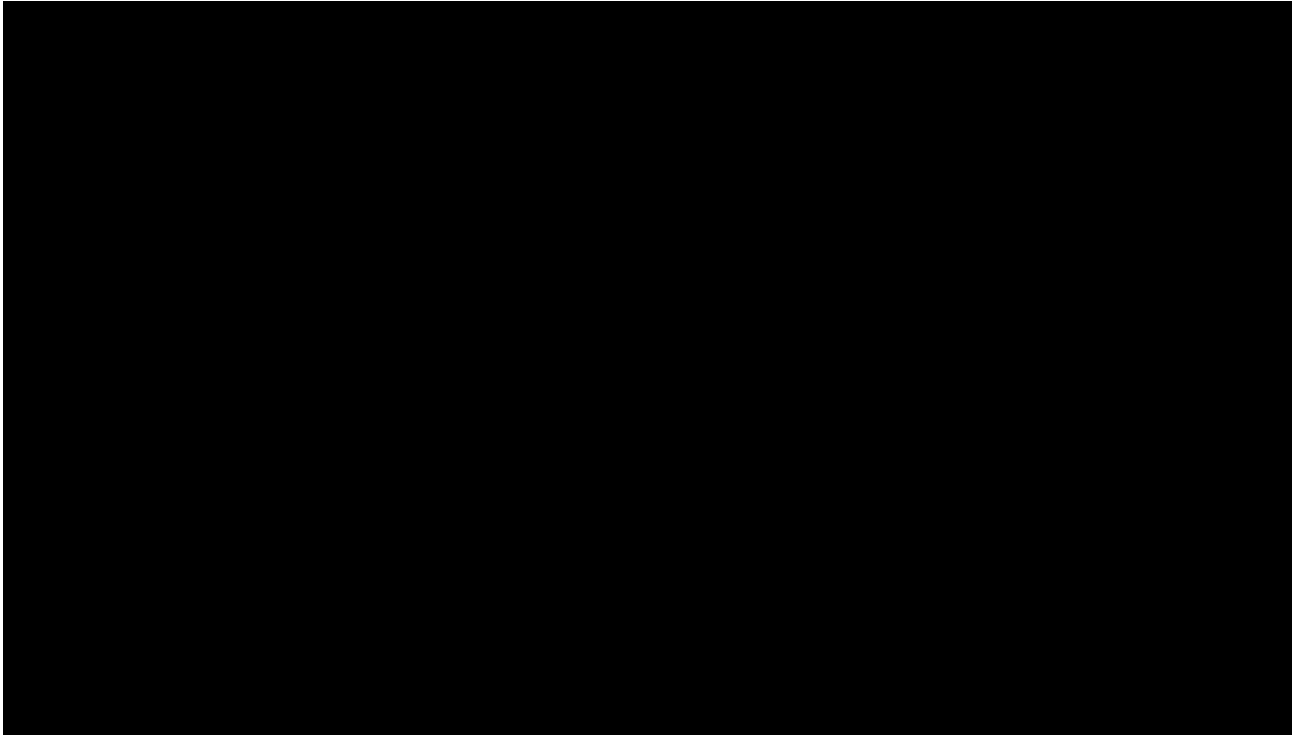
Source: Apple Transaction Data

Note: An account is assumed to have used an ‘app with payments’ if it spent more than \$0 on the app, through either a paid download or an in-app purchase. Only accounts in the proposed consumer class are included. Transactions where Apple is the developer are excluded. Each bucket includes the smaller and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

72. In addition to apps for which consumers have made paid transactions, consumers also vary in the total number of transactions (i.e., free app downloads, paid app downloads, and in-app purchases) made through the App Store. While some proposed class consumer accounts make many transactions through the App Store, others make relatively few transactions. Figure 14 shows the distribution of total App Store downloads (both free and paid) per proposed class consumer account. Over [REDACTED] percent of proposed class consumer accounts have downloaded fewer than 50 or fewer apps. However, there are many proposed class consumer accounts that have downloaded significantly more apps. [REDACTED] percent have downloaded 250 or more apps, and [REDACTED] percent have downloaded 700 or more apps.

**FIGURE 14**

*Distribution of proposed consumer accounts by number of App Store downloads (July 10, 2008 – April 25, 2021)*



Source: Apple Transaction Data

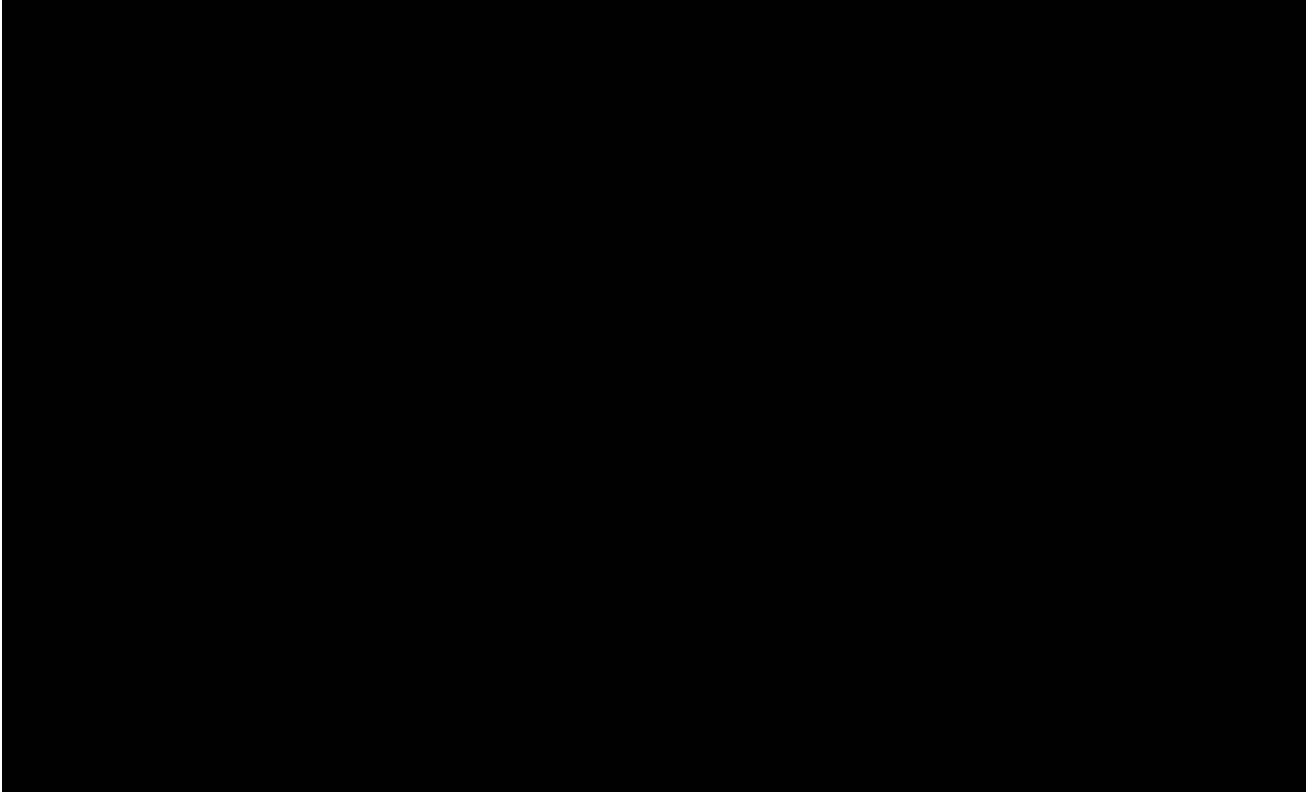
Note: Only original transactions from downloads are included. Transactions where Apple is the developer are excluded. Only accounts in the proposed consumer class are included. Only accounts with at least one initial download are included. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

73. Figure 15 similarly shows the distribution of total in-app purchases through the App Store per proposed class consumer account. I find that [REDACTED] percent of accounts had zero in-app purchases. [REDACTED] percent had at least one but less than ten in-app purchases, meaning that [REDACTED] of all accounts had less than ten in-app purchases total over the nearly 13-year period covered by the data. On the other end, [REDACTED] percent of accounts have made more than one hundred in-app purchases. [REDACTED] percent of proposed class consumer accounts have made both paid download and in-app purchase transactions while [REDACTED] percent have only made in-app purchase transactions and [REDACTED] percent have only made paid download transactions.<sup>107</sup>

<sup>107</sup> See my workpapers.

**FIGURE 15**

*Distribution of proposed consumer accounts by number of App Store in-app purchases (July 10, 2008 – April 25, 2021)*

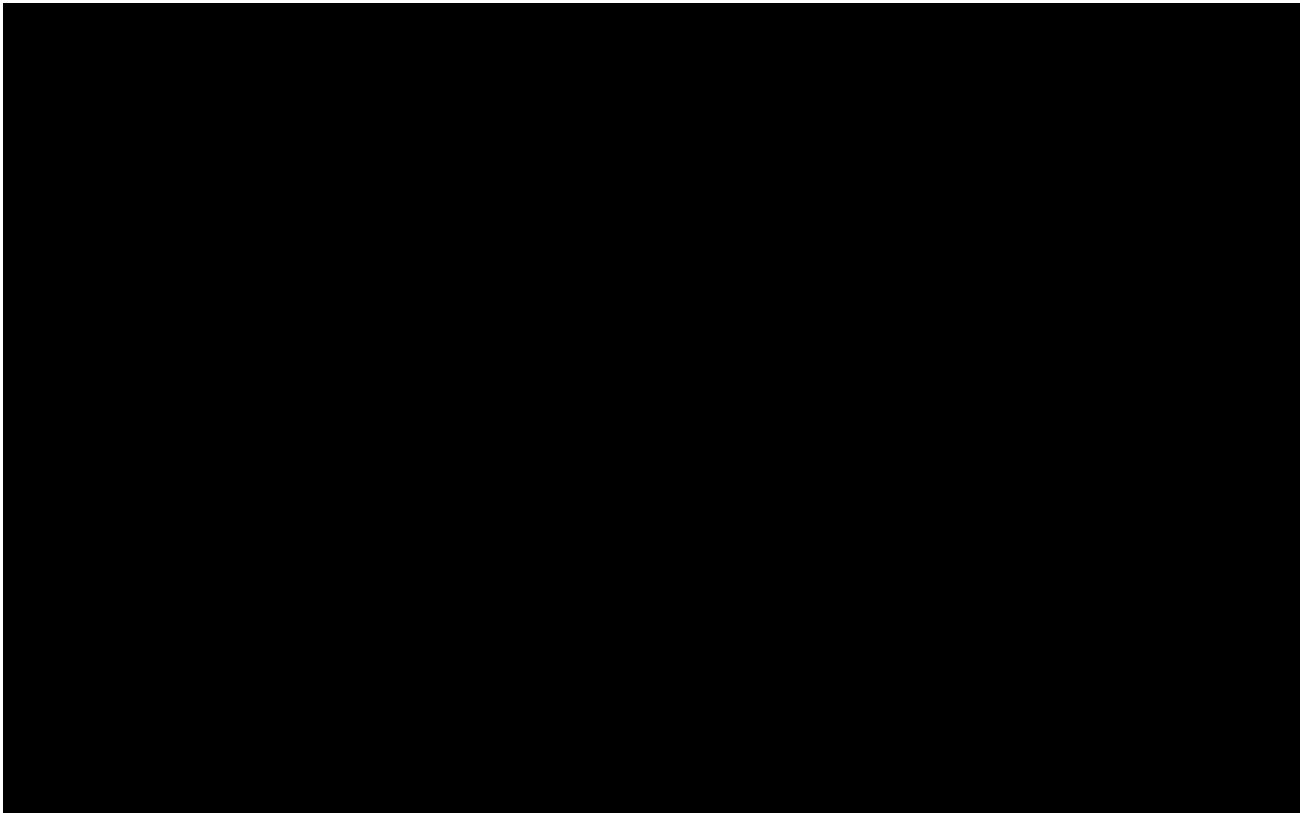


Source: Apple Transaction Data

Note: Only original transactions from in-app purchases are included. Transactions where Apple is the developer are excluded. Only accounts in the proposed consumer class are included. The first instance of an in-app purchase is June 17, 2009. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

74. Proposed class consumer accounts also vary in the dollar amount they have spent on paid downloads and digital in-app purchases on the App Store. Figure 16 shows the distribution of proposed class consumer accounts by total App Store spending from paid downloads and digital in-app purchases. [REDACTED] proposed class consumer accounts, [REDACTED] percent, have spent less than \$150 on paid downloads or in-app purchases for the entire proposed class period. In fact, [REDACTED] percent of consumer accounts have spent less than \$10 on paid download or digital in-app purchases, [REDACTED] percent have spent between \$10 and \$50, and [REDACTED] percent have spent between \$50 and \$100. At the same time, there are some consumers that have spent a much larger amount on paid downloads and digital in-app purchases – over [REDACTED] percent of consumers have spent \$1,500 or more through the App Store.



**FIGURE 16*****Distribution of proposed consumer accounts by App Store spending (July 10, 2008 – April 25, 2021)***

Source: Apple Transaction Data

Note: Revenue is total billings from in-app purchases and initial downloads. Transactions where Apple is the developer are excluded. Only accounts in the proposed consumer class are included. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

75. Proposed class consumer accounts also differ in the types of devices used to transact through the App Store. While [REDACTED] percent of proposed class consumer accounts have paid transactions through the App Store on both an iPhone and iPad, [REDACTED] percent have paid transactions on only an iPhone, and [REDACTED] percent have transacted on only an iPad.<sup>108</sup>

76. As previously discussed, developers can choose to categorize their apps into one of 27 app genres on the App Store.<sup>109</sup> Consumers, in turn, vary in the genre of apps they download and use. Figure 17 shows the proportion of proposed class consumer accounts that have downloaded apps (typically for free) from each genre. As can be seen, there are several app genres, such as games, entertainment, social networking, utilities, and photo and video, for which a large share (over [REDACTED] percent) of proposed class consumer accounts have downloaded an app. However, there are other genres in which a majority of proposed class consumer

<sup>108</sup> See my workpapers. These percentages do not add up to 100 percent because some proposed consumer class members also made paid transactions through other devices, such as iPod touch or Apple Watch.

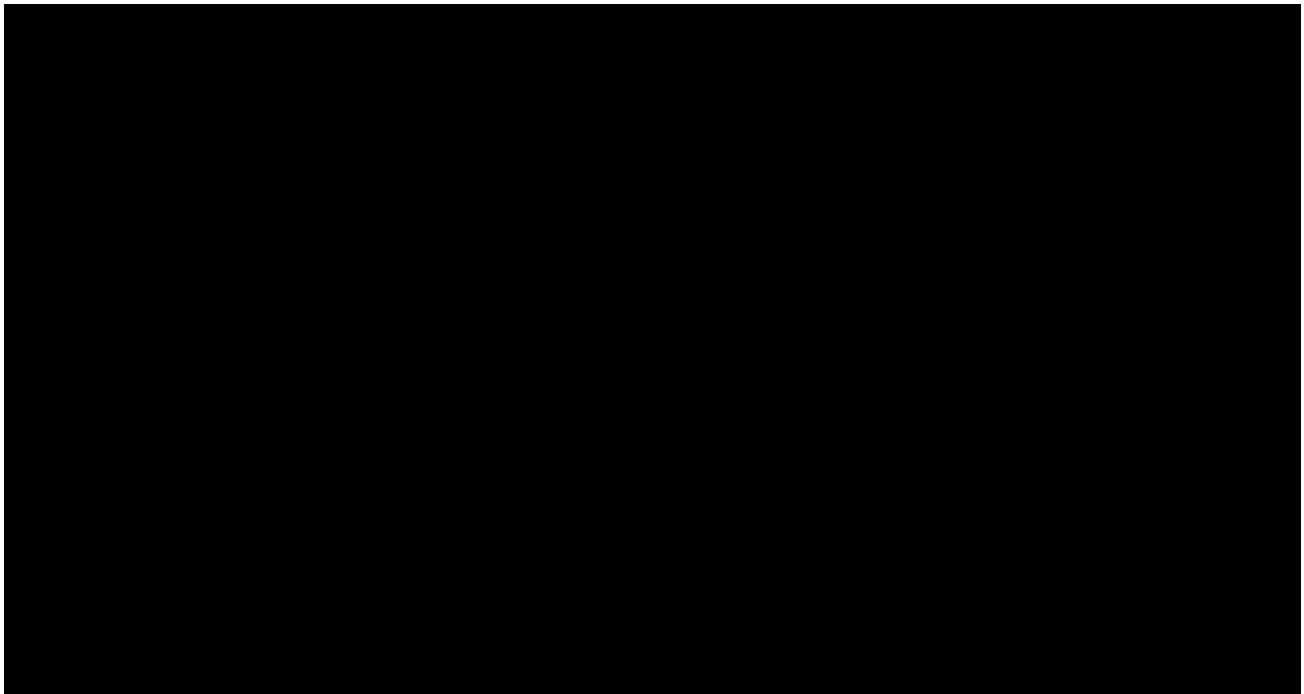
<sup>109</sup> See ¶ 49.

accounts have never downloaded an app. For instance, ██████ percent of proposed class consumer accounts have downloaded catalogs, developer tools, magazines and newspapers, or stickers. Approximately ██████ of proposed class consumer accounts have downloaded apps from genres such as medical and weather and a quarter from graphics & design.

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**FIGURE 17**

Percent of proposed consumers accounts with an app download through the App Store by genre (July 10, 2008 – April 25, 2021)



Source: Apple Transaction Data

Note: Only original transactions from downloads are included. Transactions where Apple is the developer are excluded. Only accounts in the proposed consumer class are included. The denominator for the percent of accounts is the total number of accounts in the proposed consumer class. See Appendix F for details regarding Apple transaction data processing.

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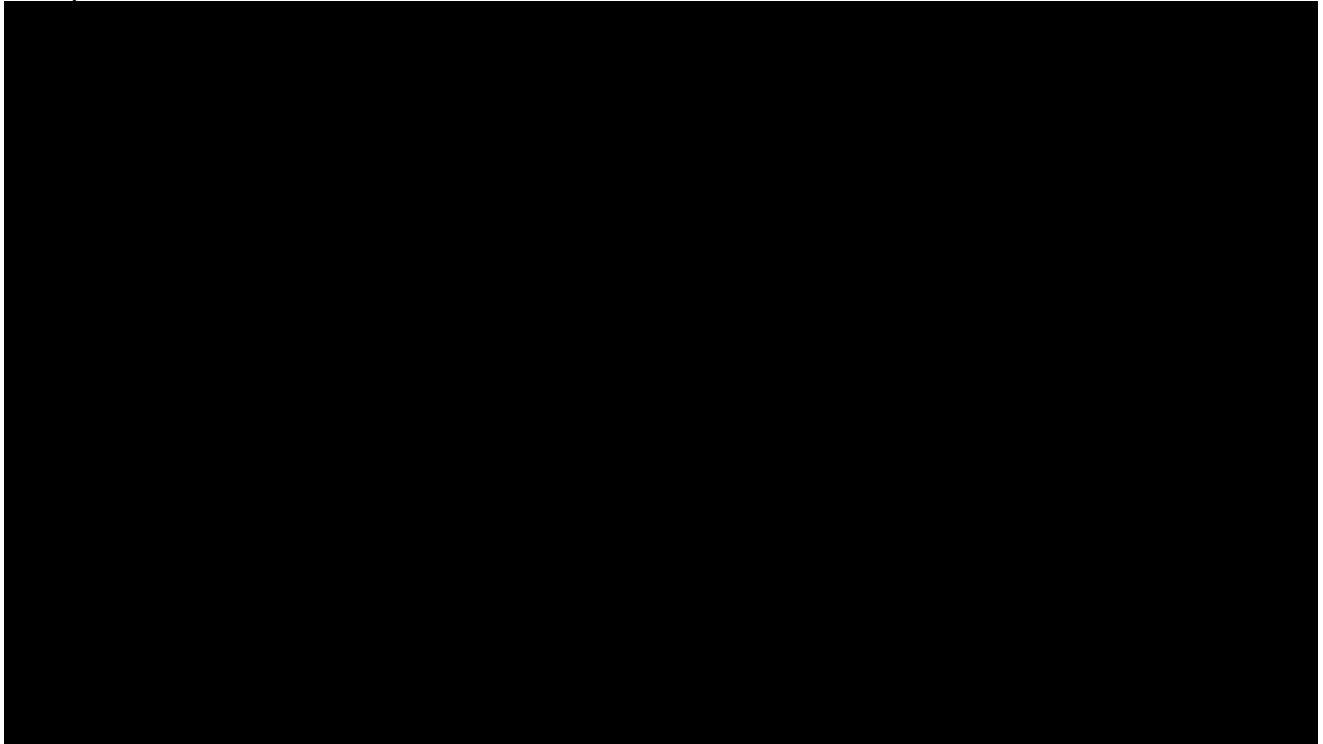
77. Consumers also vary in terms of the types of app on which they spend money. Figure 18 shows for each app genre the proportion of proposed class consumer accounts that have made at least one paid transaction through the App Store. A majority of proposed class consumer accounts ██████ percent – have made at least one paid game transaction. Moreover, 16.7 percent of proposed class consumer accounts *only* made paid transactions for games.<sup>110</sup> Every other app genre has a much lower proportion of proposed class consumer accounts making some form of paid transaction (less than ██████ percent).

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<sup>110</sup> See my workpapers.

**FIGURE 18**

*Percent of proposed consumer accounts with spend through the App Store by genre (July 10, 2008 – April 25, 2021)*



Source: Apple Transaction Data

Note: Transactions where Apple is the developer are excluded. Only accounts in the proposed consumer class are included. The denominator for the percent of accounts is the total number of accounts in the proposed consumer class. See Appendix F for details regarding Apple transaction data processing.

### **5.5. Other app transaction platforms**

78. In addition to transacting on the App Store, app developers and app consumers can transact on other two-sided app transaction platforms that enable app transactions for various mobile devices, PCs, consoles, and other devices. While two-sided transaction platforms have many ways in which they can charge for use of the platform, all observed app transaction platforms have chosen to monetize by charging a percentage commission on the revenues generated from paid downloads and digital in-app purchase transactions.<sup>111</sup> Almost without exception, each app transaction platform has charged a headline commission rate of 30 percent. Each app transaction platform then may have (or may not have) offered other rates depending on a variety of individualized circumstances including the type of app, the developer, the amount of revenue, and individual negotiation. While app transaction platforms serving mobile devices, PCs, and consoles share a common 30 percent headline

<sup>111</sup> See Section 5.2.3.

commission rate, there has not been, and is not, any single, consistent commission rate below 30 percent that applies for all app transaction platforms for any type of device.

79. In Figure 19, Figure 20, and Figure 21, I list the standard commission rates (i.e., excluding commission rates that are individually negotiated between a developer and a platform) for each top app transaction platform. I call these commission rates “headline commission rates.” As can be seen, with limited exceptions, each app transaction platform has set the same headline commission rate as the headline commission rate on the App Store – 30 percent.

**FIGURE 19**

*Commission rates on mobile app transaction platforms*

App Transaction Platform	Headline Commission Rate	Subscription Renewal Commission Rate	Other Commission Rate Details
<b>Amazon Appstore</b>			
March 2011–September 25, 2018	30%		
September 25, 2018–Q4 2021	30%		20%: Commission rate for movie and TV subscriptions
Starting Q4 2021	30%		20%: Commission rate for movie and TV subscriptions 20%: Developers with less than \$1 million in yearly worldwide revenue. Developers with less than \$1 million in yearly Appstore revenue can also receive 10% of their revenue as promotional credit for Amazon Web Services
<b>App Store</b>			
July 2008–June 13, 2016	30%		
June 13, 2016–January 1, 2021 <sup>[1]</sup>	30%	15%	15%: Video Partner Program
January 1, 2021–present	30%	15%	15%: Developers with less than \$1 million in yearly worldwide revenue 15%: Video Partner Program
<b>Google Play<sup>[2]</sup></b>			
October 2008–January 1, 2018	30%		
January 1, 2018–June 23, 2021	30%	15%	
June 23, 2021–July 1, 2021	30%	15%	15%: Play Media Experience
July 1, 2021–present	30%	15%	15%: Play Media Experience 15%: Commission rate on first \$1 million in annual worldwide developer revenue (30% on revenue over \$1 million)
<b>Samsung Galaxy Store</b>			
	30%		

Source: See exhibit backup for a full list of sources.

Note:

[1] The 15% commission on subscription renewals was implemented on June 13, 2016. The Video Partner program dates to 2016 but the exact date of introduction is unknown.

[2] Google Play was initially named Android Market. In 2012, it was renamed to Google Play.

**FIGURE 20****Commission rates on PC app transaction platforms**

App Transaction Platform	Headline Commission Rate	Subscription Renewal Commission Rate	Other Commission Rate Details
<b>Discord Store</b>	<b>10%</b>		
<b>Epic Games Store</b>	<b>12%</b>		
<b>GOG<sup>[1]</sup></b>	<b>30%</b>		<b>40%:</b> Commission rate if GOG provides an advance on developer royalties to help fund the completion of the game
<b>Mac App Store</b>			
January 2011–June 13, 2016	<b>30%</b>		
June 13, 2016–January 1, 2021 <sup>[2]</sup>	<b>30%</b>	<b>15%</b>	<b>15%:</b> Video Partner Program
January 1, 2021–present	<b>30%</b>	<b>15%</b>	<b>15%:</b> Small developers with less than \$1 million in yearly worldwide revenue <b>15%:</b> Video Partner Program
<b>Microsoft Store on Windows<sup>[3]</sup></b>			
October 2012–January 1, 2015	<b>30%</b>		<b>20%:</b> Commission rate reduced after \$25k in sales
January 1, 2015–October 26, 2017	<b>30%</b>		
October 26, 2017–March 5, 2019	<b>30%:</b> game apps <b>15%:</b> non-game apps		
March 5, 2019–January 14, 2020	<b>30%:</b> game apps <b>15%:</b> non-game apps		<b>5%:</b> Commission rate if consumer acquisition was directly driven by developer's promotion activities
January 14, 2020–July 28, 2021	<b>30%:</b> game apps <b>15%:</b> non-game apps		
July 28, 2021–August 1, 2021	<b>30%:</b> game apps <b>15%:</b> non-game apps		<b>0%:</b> Commission rate for non-game apps when using third-party payment processing method
August 1, 2021–present	<b>12%:</b> game apps <b>15%:</b> non-game apps		<b>0%:</b> Commission rate for non-game apps when using third-party payment processing method
<b>Steam</b>			
September 2003–November 30, 2018	<b>30%</b>		
November 30, 2018–present	<b>30%</b>		<b>25%:</b> Commission rate for apps with lifetime worldwide earnings between \$10 million and \$50 million <b>20%:</b> Commission rate for apps with lifetime worldwide earnings over \$50 million

Source: See exhibit backup for a full list of sources.

Note:

[1] GOG offers developers the option to pay a commission rate of 40% in return for an advance on the developer's royalties to help fund the completion of the game.

[2] The 15% commission on subscription renewals was implemented on June 13, 2016. The Video Partner program dates to 2016 but the exact date of introduction is unknown.

[3] The Microsoft Store was initially named the Windows Store and was renamed in 2017.

**FIGURE 21*****Commission rates on console app transaction platforms***

App Transaction Platform	Headline Commission Rate	Subscription Renewal Commission Rate	Other Commission Rate Details
Microsoft Store on Xbox	30%		15%: Commission rate for non-game subscription transactions
Nintendo eShop	30%		
PlayStation Store	30%		

Source: See exhibit backup for a full list of sources

Note: The Xbox Live Marketplace opened in November of 2005. In September of 2017, the Xbox Live Marketplace rebranded to the Microsoft Store on Xbox.

80. App transaction platforms for Android devices and other mobile devices (such as Google Play, Amazon Appstore, and the Samsung Galaxy Store), app transaction platforms for personal computers (such as Steam and the Mac App Store), and app transaction platforms for game consoles (such as the PlayStation Store, Nintendo eShop, and the Xbox Store) all currently charge a headline commission rate of 30 percent.<sup>112</sup> The three app transaction platforms that charge a uniformly lower commission rate across all developers are unusual and have only more recently implemented these lower headline commission rates<sup>113</sup>:

- The Epic Games Store has charged a headline commission rate of 12 percent since it launched in December 2018.<sup>114</sup> However, the Epic Games Store is not currently profitable and does not expect to break even until 2023.<sup>115</sup>

<sup>112</sup> See Figure 19, Figure 20, and Figure 21.

<sup>113</sup> Other, smaller app transaction platforms, such as Aptoide or itch.io, may also offer commission rates that vary from the 30 percent headline commission rate charged by most app transaction platforms. However, these platforms generally have fewer developers and customers and often suffer from security issues. See, e.g., Catalin Cimpanu, “Details of 20 million Aptoide app store users leaked on hacking forum,” *ZDNet*, April 17, 2020, available at <https://www.zdnet.com/article/details-of-20-million-aptoide-app-store-users-leaked-on-hacking-forum/>, accessed on August 7, 2021; Android Advices, “Remove Android:Plankton [PUP] Virus from Android Device after Downloading Apps from GetJar,” April 11, 2012, available at <https://androidadvices.com/remove-androidplanktona-pup-virus-android-device-downloading-apps-getjar/>, accessed on August 7, 2021.

<sup>114</sup> Epic Games, “The Epic Games store is now live,” December 6, 2018, available at <https://www.epicgames.com/store/en-US/news/the-epic-games-store-is-now-live>, accessed on February 8, 2021 (“...[game developers] receive 88% of the money...”).

<sup>115</sup> In the first quarter of 2020, the Epic Games Store earned [REDACTED] in revenue, under-performing its Q1 2020 plan of [REDACTED]. The cost associated with that revenue reached [REDACTED], resulting in a loss of [REDACTED]. See Epic Games, Inc., “Consolidated Financial Statements for the Quarters Ending March 31, 2020 and 2019,” undated, EPIC\_00192367 – 75 at EPIC\_00192371. In addition, Epic’s annual 2020 budget contains plans for a [REDACTED] for the Epic Games Store. See Epic Games, Inc., “Consolidated Financial Statements for the Quarters Ending March 31, 2020 and 2019,” undated, EPIC\_00192367 – 75 at EPIC\_00192371. See also Deposition of Steven Allison (Epic), Volume I, February 9, 2021, pp. 89–90 (“Q. ... And to date, EGS is still not profitable; is that correct? A. We are still investing in the business and growing, and we are not a profitable business because we are in growth mode and investing, nor is that our goal. ... I think 2023 is when we expect the current operating plan to -- to get us to break even to slight

- Microsoft lowered its commission rate for PC game app transactions to 12 percent on August 1, 2021.<sup>116</sup> On June 24, 2021, Microsoft additionally announced it would no longer charge a commission for non-game PC apps in the Microsoft Store if an app developer utilized its own payment systems or a third-party payment system.<sup>117</sup> Historically, the Microsoft Store had charged a 30 percent commission rate for PC apps transacted through the store until March 5, 2019, when Microsoft lowered its commission rate for a subset of apps (e.g., non-game PC app transactions) to 15 percent. At that time it also set a 5 percent commission rate for transactions in which a user follows a link directly to an app's page on the store (i.e., the user does not navigate to the app from within the store).<sup>118</sup>
- The Discord Store launched in August 2018 in Canada and then launched a beta version more broadly on October 16, 2018.<sup>119</sup> Starting in 2019, the Discord Store began charging developers a 10 percent commission rate.<sup>120</sup> However, the platform struggled to attract customers and was largely abandoned within 13 months.<sup>121</sup> The latest update from the Discord developer portals is that "game approval submissions are currently paused due to unforeseen circumstances."<sup>122</sup>

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profitability."); Epic Trial Testimony of Steven Allison (Epic), May 3, 2021, p. 1230 ("Q. Mr. Allison, is the Epic Games Store profitable today? A. No.").

<sup>116</sup> Microsoft Store, "2021 App Developer Agreement," June 28, 2021 ("2021 Microsoft App Developer Agreement"), available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4OG2b>, accessed on August 8, 2021, Section 6b; Tom Warren, "Microsoft shakes up PC gaming by reducing Windows store cut to just 12 percent," *The Verge*, April 29, 2021, available at <https://www.theverge.com/2021/4/29/22409285/microsoft-store-cut-windows-pc-games-12-percent>, accessed on July 27, 2021.

<sup>117</sup> K. Holt, "Microsoft Store is getting a much-needed overhaul for Windows 11," *engadget*, June 24, 2021, available at <https://www.engadget.com/windows-11-microsoft-store-redesign-154155457.html>, accessed on July 27, 2021.

<sup>118</sup> Microsoft PAX Presentation, "Project Brazil," April 2018, MSFT\_EPIC\_00000348 ("Project Brazil Presentation"), slide 3; Dan Thorp-Lancaster, "Microsoft Store now gives app developers a bigger cut of revenues," *Windows Central*, March 5, 2019, available at <https://www.windowscentral.com/microsoft-store-now-gives-app-developers-bigger-cut-revenue>, accessed on July 28, 2021.

<sup>119</sup> Nelly, "The Discord Store Beta," *Discord Blog*, August 9, 2018, available at <https://blog.discord.com/the-discord-store-beta-9a35596fdd4>, accessed on August 9, 2021; Nick Statt, "Discord's game store launches globally today with indie gems like Hollow Knight and Dead Cells," *The Verge*, October 16, 2018, available at <https://www.theverge.com/2018/10/16/17980810/discord-digital-game-distribution-store-steam-competitor-nitro-subscription-service>, accessed on August 9, 2021.

<sup>120</sup> Nelly, "Why not 90/10?" *Discord Blog*, December 14, 2018, available at <https://blog.discord.com/why-not-90-10-3761ebef4eab>, accessed on August 9, 2021.

<sup>121</sup> Chris Welch, "Discord gives up on subscription games because no one was playing them," September 13, 2019, available at <https://www.theverge.com/2019/9/13/20864278/discord-nitro-games-subscription-bundle-discontinued>, accessed on August 9, 2021.

<sup>122</sup> Discord, "How to Get Your Game on Discord," available at <https://discord.com/developers/docs/game-and-server-management/how-to-get-your-game-on-discord>, accessed on August 9, 2021. For the last announcement made by Discord on the game developer portal, see also Grizz0, "Approval for Commerce Currently on Pause," August 2020, *Discord*, available at <https://support-dev.discord.com/hc/en-us/articles/360041437171-Approval-for-Commerce-Currently-on-Pause>, accessed on August 9, 2021.



81. With the exception of these three platforms, all other app transaction platforms have and continue to charge headline commission rates of 30 percent. Some app transaction platforms charge a lower commission rate for certain types of transactions, based on specific criteria about the type of app, the type of developer, or the type of transaction. Some app transaction platforms also charge individually negotiated contractual rates for specific developers.

82. For each of the app transaction platforms listed in Figure 19, Figure 20, and Figure 21, I now describe in more detail the types of apps transacted on the platform (and the types of devices for those apps), the commission rates charged, the size of the platform, and other relevant details.

### *5.5.1. App transaction platforms for mobile devices*

#### *5.5.1.1 Google Play*

83. Google Play launched in October 2008 and offers all varieties of apps for Android devices.<sup>123</sup> As of the first quarter of 2021, it was the largest Android app transaction platform in the world with 3.5 million apps.<sup>124</sup> As of December 2020, approximately [REDACTED] U.S. developers offered apps on Google Play.<sup>125</sup> The vast majority of these apps (96.9 percent) are free for consumers.<sup>126</sup>

84. Since launch, Google Play has charged developers who transact apps through Google Play a one-time \$25 fee and a headline commission rate of 30 percent.<sup>127</sup> However, Google has refined its headline commission rate over time. In January 2018, Google Play established a commission rate of 15 percent for all subscription renewals after the first year.<sup>128</sup> In June

<sup>123</sup> Google introduced the Android Market in 2008 and rebranded as Google Play in 2012. See Melissa Perenson, “Google Launches Android Market,” *PCWorld*, October 22, 2008, available at [https://www.pcworld.com/article/152613/google\\_android\\_ships.html](https://www.pcworld.com/article/152613/google_android_ships.html), accessed on February 1, 2021 (“Concurrent with the launch of the T-Mobile G1 Android-based mobile phone today [October 22, 2008], Google is launching Android Market.”); Mitja Rutnik, “What was Android Market and how is Google Play different?” *Android Authority*, December 4, 2017, available at <https://www.androidauthority.com/android-market-google-play-different-787082/>, accessed on January 31, 2021 (“To avoid confusion, Google decided to rebrand the Android Market. In 2012, Google Play was launched.”).

<sup>124</sup> Statista, “Number of apps available in leading app stores as of 1<sup>st</sup> quarter 2021,” July 6, 2021, available at <https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>, accessed on August 8, 2021.

<sup>125</sup> GOOG\_APPL\_00004102.xlsx, Tab “Total Number of U.S. App Develo.”

<sup>126</sup> Statista, “Distribution of free and paid Android apps in the Google Play Store as of July 2021,” July 2021, available at <https://www.statista.com/statistics/266211/distribution-of-free-and-paid-android-apps/>, accessed on August 9, 2021.

<sup>127</sup> Google, “How to use Play Console,” available at <https://support.google.com/googleplay/android-developer/answer/6112435?hl=en#zippy=%2Cstep-pay-registration-fee>, accessed on August 9, 2021; Google, “Service fees,” available at <https://support.google.com/googleplay/android-developer/answer/112622>, accessed on August 9, 2021.

<sup>128</sup> Google Play Console Help, “Service fees,” available at <https://web.archive.org/web/20210410004950/https://support.google.com/googleplay/android->

2021, Google announced its “Play Media Experience Program” which allows some developers of media apps to pay a 15 percent commission.<sup>129</sup> Requirements include having 100,000 or more monthly active installs on Google Play, offering a “high quality user experience,” integration of Google platforms and APIs such as Android TV or Google Cast, and the developer’s account being in “good standing” with Google.<sup>130</sup> In July 2021, following the announcement of Apple’s Small Business Program, Google established a commission rate of 15 percent on the first \$1 million in annual developer revenues through Google Play with a 30 percent commission rate on annual developer revenues in excess of \$1 million.<sup>131</sup> At the time, Google estimated that “99% of developers that sell goods and services with Play will see a 50% reduction in fees, and that 97% of apps globally do not sell digital goods or pay any service fee.”<sup>132</sup>

85. An internal Google presentation from August 2020 indicates that Google has additional commission rates through its Games Velocity Program and other commercial programs, which establish relationships with approximately [REDACTED] developers that involve a variety of different commission rates and contractual structures.<sup>133</sup> This includes some developers that receive [REDACTED] for other Google services alongside the 30 percent commission rate. Other developers of certain [REDACTED] and video apps pay reduced

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developer/answer/112622?hl=en, accessed on April 10, 2021 (“As of January 1, 2018, the service fee for subscription products decreases to 15% for any subscribers you retain after 12 paid months.”).

<sup>129</sup> Google Play Console, “Play Media Experience Program,” available at <https://play.google.com/console/about/mediaprogram/>, accessed on July 28, 2021; Sophie Webster, “Google’s Play Media Experience Program Lets App Developers Keep More of What They Earn,” *Tech Times*, June 24, 2021, available at <https://www.techtimes.com/articles/261927/20210624/googles-play-media-experience-program-lets-app-developers-keep-more.htm>, accessed on July 28, 2021.

<sup>130</sup> Google Play Console, “Play Media Experience Program,” available at <https://play.google.com/console/about/mediaprogram/>, accessed on July 28, 2021.

<sup>131</sup> Google Play Console Help, “Change to Google Play’s service fee in 2021,” available at <https://support.google.com/googleplay/android-developer/answer/10632485?hl=en>, accessed on July 28, 2021; Manish Singh, “Google Play drops commissions to 15% from 30%, following Apple’s move last year,” *Tech Crunch*, March 16, 2021, available at <https://techcrunch.com/2021/03/16/google-play-drops-commissions-to-15-from-30-following-apples-move-last-year/>, accessed on July 28, 2021.

<sup>132</sup> Manish Singh, “Google Play drops commissions to 15% from 30%, following Apple’s move last year,” *TechCrunch*, March 16, 2021, available at <https://techcrunch.com/2021/03/16/google-play-drops-commissions-to-15-from-30-following-apples-move-last-year/>, accessed on August 8, 2021.

<sup>133</sup> Google documentation identifies at least six programs to “address developer needs and economics in a targeted manner.” These are: (i) the “Games Velocity Program,” with a 30 percent revenue share and a [REDACTED]

[REDACTED] See Google Presentation, “Google Play Business Model,” August 19, 2020, GOOG-APPL-00126037 – 74 at GOOG-APPL-00126047.

commission rates of [REDACTED] or 15 percent.<sup>134</sup> Google approximates that [REDACTED] of the total spending on Google Play is from developers participating in these commercial programs.<sup>135</sup>

#### 5.5.1.2 Samsung Galaxy Store

86. Samsung first launched Samsung Apps in September 2009.<sup>136</sup> The platform was rebranded to Samsung Galaxy Apps on July 11, 2014.<sup>137</sup> At its launch, Samsung announced that the platform would provide hundreds of apps exclusively to owners of Samsung Galaxy phones.<sup>138</sup>

87. Samsung does not charge developers a fee to access the platform. Since rebranding the platform, the Samsung Galaxy Store has charged a headline commission rate of 30 percent on paid transactions made through the platform.<sup>139</sup> The platform's terms and conditions for developers do however note that "[a]n alternative revenue share rate may be established upon mutual written agreement during the certification process for an Application."<sup>140</sup> For example, [REDACTED]<sup>141</sup>

#### 5.5.1.3 Amazon Appstore

88. The Amazon Appstore launched on Android devices on March 22, 2011.<sup>142</sup> The store is also available on some BlackBerry and Windows-based devices as well as devices that run

<sup>134</sup> Google Presentation, "Google Play Business Model," August 19, 2020, GOOG-APPL-00126037 – 74 at GOOG-APPL-00126047.

<sup>135</sup> Google Presentation, "Google Play Business Model," August 19, 2020, GOOG-APPL-00126037 – 74 at GOOG-APPL-00126047.

<sup>136</sup> Samsung Newsroom, "Samsung Apps celebrates 2nd anniversary with new version of apps store," September 20, 2011, available at <https://news.samsung.com/global/samsung-apps-celebrates-2nd-anniversary-with-new-version-of-apps-store>, accessed on August 10, 2021.

<sup>137</sup> Samsung Newsroom, "Samsung Electronics Launches Samsung GALAXY Apps," July 11, 2014, available at <https://news.samsung.com/global/samsung-electronics-launches-samsung-galaxy-apps>, accessed on July 27, 2021.

<sup>138</sup> Michael Andronico, "Samsung's Revamped Galaxy Apps Takes on Google Play," *Laptop Mag*, July 11, 2014, available at <https://www.laptopmag.com/articles/samsung-galaxy-apps-store>, accessed on July 27, 2021.

<sup>139</sup> Samsung Apps, "Samsung Galaxy Store Seller Portal: Terms and Conditions," 2021, available at <https://seller.samsungapps.com/help/termsAndConditions.as>, accessed on August 3, 2021, Section 6.

<sup>140</sup> Samsung Galaxy Store Seller Portal Document, "Terms and Conditions," January 11, 2021, SEA\_00041531 – 541 at SEA\_00041533.

<sup>141</sup> See for example, Email chain from Tim Sweeney to Mark Rein et. al., "Re: Android - wild idea," February 18, 2018, EPIC\_00091478 - 82 at EPIC\_00091479 – 80 and Email from Thomas Ko to Tim Sweeney, "RE: Note 9 + Fortnite launch," August 9, 2018, EPIC\_00012739.

<sup>142</sup> Jason Kincaid, "Amazon's Android App Store Launches: Test Drive Apps Directly From Your Browser," *Tech Crunch*, March 22, 2011, available at <https://techcrunch.com/2011/03/22/amazon-android-app-store-3/>, accessed on July 30, 2021.

Amazon's Fire OS.<sup>143</sup> The Amazon Appstore contains a broad range of apps, [REDACTED] [REDACTED]<sup>144</sup> In 2020, gross sales on the Amazon Appstore for all transactions, for all available devices, exceeded \$ [REDACTED]. The Amazon Appstore facilitated more than [REDACTED] transactions (both free and paid) in 2020.<sup>145</sup> In December 2020, over [REDACTED] developers had at least one free or paid transaction through the Amazon Appstore.<sup>146</sup> On average, developers offered over [REDACTED] apps per month to consumers through the Amazon Appstore in 2020.<sup>147</sup>

89. The Amazon Appstore does not charge developers a fixed fee to transact on the Amazon Appstore, but similar to other mobile app platforms, [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] Amazon differs from other mobile platforms with respect to its policies for in-app advertising for which it charges developers a 10 percent commission rate.<sup>150</sup>

90. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

<sup>143</sup> Jacob Kastrenakes, "BlackBerry will bring thousands of apps from Amazon's store to its phones," *The Verge*, June 18, 2014, available at <https://www.theverge.com/2014/6/18/5820472/blackberry-phones-getting-amazon-appstore-apps-in-bb10-3>, accessed on July 30, 2021; Tom Warren, "Microsoft is bringing Android apps to Windows 11 with Amazon's Appstore," *The Verge*, June 24, 2021, available at <https://www.theverge.com/2021/6/24/22548428/microsoft-windows-11-android-apps-support-amazon-store>, accessed on July 30, 2021; Amazon, "About the Amazon Appstore," available at <https://www.amazon.com/gp/help/customer/display.html?nodeId=GP96AU3MQ58FMV8U>, accessed on July 30, 2021.

<sup>144</sup> See Amazon, "Amazon.com: Apps & Games," available at <https://www.amazon.com/mobile-apps/b?ie=UTF8&node=2350149011>, accessed on July 30, 2021; Statista, "Distribution of free and paid Android apps in Amazon Appstore as of July 2021," July 2021, available at <https://www.statista.com/statistics/256776/distribution-paid-free-amazon-appstore-apps/>, accessed on August 8, 2021.

<sup>145</sup> [REDACTED].

<sup>146</sup> [REDACTED]

<sup>147</sup> [REDACTED]

<sup>148</sup> Amazon, "Amazon Developer Services Agreement," June 9, 2021, available at <https://developer.amazon.com/support/legal/da>, accessed on July 28, 2021, pp. 7–8.

<sup>149</sup> [REDACTED]

<sup>150</sup> Schmalensee Report Exhibit 5.B.

<sup>151</sup> [REDACTED]  
[REDACTED]

[REDACTED]

In addition, starting on October 1, 2021, and similar to other platforms, Amazon plans to apply a commission rate of 20 percent for developers with less than \$1 million in revenue in the previous calendar year. As part of this new program, developers under the \$1 million revenue threshold will also become eligible for credits toward payments on Amazon Web Services.<sup>154</sup>

### 5.5.2. App transaction platforms for personal computers

#### 5.5.2.1 Steam

91. Valve launched Steam on September 12, 2003.<sup>155</sup> Initially, Steam only offered games developed by Valve for Windows PCs; however, beginning in 2005, it began to facilitate transactions of games developed by other firms, and in 2010 it began to offer transactions for games for Macs.<sup>156</sup> [REDACTED].<sup>157</sup> As of August 8, 2021, more than 46,611 games were listed on Steam, of which 7.5 percent (or 3,512) were free for consumers.<sup>158</sup>

92. Valve charges developers a \$100 fee for each app it transacts on Steam.<sup>159</sup> Before November 30, 2018, Valve charged a 30 percent commission on games sold through the Steam platform.<sup>160</sup> On November 30, 2018, Steam established a commission rate of 30

<sup>154</sup> Palanidaran Chidambaram, “Coming Soon: Amazon Appstore Small Business Accelerator Program,” *Amazon Appstore*, June 15, 2021, available at <https://developer.amazon.com/blogs/appstore/post/93e89be7-1611-4764-8f97-f4eef0a7c0e0/coming-soon-amazon-appstore-small-business-accelerator-program>, accessed on July 28, 2021.

<sup>155</sup> Matt Sayer and Tyler Wilde, “The 15-year Evolution of Steam,” *PC Gamer*, September 12, 2018, available at <https://www.pcgamer.com/steam-versions>, accessed on August 1, 2021.

<sup>156</sup> Matt Sayer and Tyler Wilde, “The 15-year Evolution of Steam,” *PC Gamer*, September 12, 2018, available at <https://www.pcgamer.com/steam-versions>, accessed on August 1, 2021.

<sup>157</sup> Valve Corporation, “Net Steam Sales, Partner Revenue Share Payments and Net to Valve,” VALVE000677.

<sup>158</sup> Steamspy, “Games released in free genre,” available at <https://steamspy.com/genre/Free>, accessed on August 8, 2021; Steamspy, “Games Released In Previous Months,” available at <https://steamspy.com/year/>, accessed on August 10, 2021.

<sup>159</sup> Steamworks “Steamworks Documentation,” available at <https://partner.steamgames.com/doc/gettingstarted/appfee>, accessed on August 10, 2021 (“Whether you are completing the Steam Direct signup process or are already an established Steamworks developer, you can now simply pay a \$100 USD (or equivalent) fee for each new app you wish to distribute on Steam. Read below for details on how it works.”).

<sup>160</sup> Nick Statt, “Valve’s new Steam revenue agreement gives more money to game developers,” *The Verge*, November 30, 2018, available at <https://www.theverge.com/2018/11/30/18120577/valve-steam-gamemarketplace-revenue-split-new->

percent for the first \$10 million in lifetime net sales (i.e., after subtracting commissions) for an app, 25 percent for lifetime net sales between \$10 million and \$50 million for an app, and a commission rate of 20 percent for lifetime net sales over \$50 million for an app.<sup>161</sup> Thus, for developers with multiple apps on Steam, the developer could potentially pay different commission rates for each app. A presentation produced by Valve suggests that in 2019, Valve anticipated that [REDACTED].<sup>162</sup>

#### 5.5.2.2 GOG.com

93. GOG.com launched in 2008.<sup>163</sup> While GOG.com's headline commission is 30 percent, it also offers developers the option to pay a higher commission rate of 40 percent in return for an advance on the developer's royalties to help fund the completion of the game.<sup>164</sup> Additionally, GOG has communicated that it has a "very individual and flexible approach to every partner" and that "... 30% revenue share is only a starting point for individual talks."<sup>165</sup>

#### 5.5.2.3 Mac App Store

94. The Apple Mac App Store launched on January 6, 2011, and can be accessed using the MacBook Air, MacBook Pro, iMac, Mac Pro, and Mac Mini.<sup>166</sup> Using data from the Mac App Store, I find that in 2020, there were [REDACTED] download transactions and [REDACTED] in-app purchase transactions on the Mac App Store.<sup>167</sup> These generated [REDACTED] in total

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rules-competition, accessed on February 8, 2021 ("Normally, Valve takes around 30 percent of all game sales on Steam...").

<sup>161</sup> Nick Statt, "Valve's new Steam revenue agreement gives more money to game developers," *The Verge*, November 30, 2018, available at <https://www.theverge.com/2018/11/30/18120577/valve-steam-gamemarketplace-revenue-split-new-rules-competition>, accessed on February 8, 2021. Steam, "New Revenue Share Tiers and other updates to the Steam Distribution Agreement," November 30, 2018, VALVE 000389 – 90 at VALVE 000389.

<sup>162</sup> Valve Corporation Presentation, "Steam Rev Share – Group Update," VALVE000617 at VALVE000620. [REDACTED]

<sup>163</sup> Eddie Makuch, "GOG Celebrates Six Years of Advancing the "DRM-Free Movement," *GameSpot*, September 8, 2014, available at <https://www.gamespot.com/articles/gog-celebrates-six-years-of-advancing-the-drm-free/1100-6422150/>, accessed on August 8, 2021.

<sup>164</sup> Ninichi, "11 Places to Publish & Release Your Indie Game," *Ninichi Music*, September 12, 2017, available at <https://ninichimusic.com/blog/2017/9/1/11-places-to-publish-release-your-indie-game>, accessed on July 28, 2021.

<sup>165</sup> Tom Marks, "Report: Steam's 30% Cut Is Actually the Industry Standard," *IGN*, January 13, 2020, available at <https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard>, accessed on July 28, 2021.

<sup>166</sup> Darren Murph, "Apple Mac App Store: open for business starting January 6th," *Engadget*, December 16, 2010, available at <https://www.engadget.com/2010-12-16-apple-mac-app-store-open-for-business-starting-january-6th.html>, accessed on August 6, 2021; Apple, "The Mac App Store," 2021, available at <https://www.apple.com/uk/osx/apps/app-store/>, accessed on August 6, 2021.

<sup>167</sup> All figures exclude apps for which Apple is the developer. See my workpapers.

revenue, of which [REDACTED] was earned by developers.<sup>168</sup> [REDACTED] of apps offered on the Mac App Store in 2020 were free of charge for consumers.<sup>169</sup>

95. Apple has charged developers a headline commission rate of 30 percent on the Mac App Store since its launch.<sup>170</sup> Additionally, Apple drops the commission rate to 15 percent for developers in the small business program and for subscription renewals after one year.<sup>171</sup>

96. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

#### 5.5.2.4 Microsoft Store for Windows

97. Microsoft launched its Windows Store in October 2012.<sup>173</sup> The Windows Store was rebranded to Microsoft Store on September 22, 2017.<sup>174</sup>

98. In addition to its commission rates, Microsoft charges developers up to \$99 for access to its platform.<sup>175</sup> Prior to October 26, 2017, the Microsoft Store for Windows charged a 30 percent headline commission rate for all apps.<sup>176</sup> During the period from October 2012 to

<sup>168</sup> See my workpapers.

<sup>169</sup> See my workpapers.

<sup>170</sup> Apple, “Mac App Store,” 2011, available at <https://web.archive.org/web/20110320225841/http://developer.apple.com/programs/mac/distribution.html>, accessed on August 9, 2021.

<sup>171</sup> Apple, “Auto-renewable Subscriptions,” 2021, available at <https://developer.apple.com/app-store/subscriptions/>, accessed on August 9, 2021; Apple, “App Store Small Business Program,” 2021, available at <https://developer.apple.com/app-store/small-business-program/>, accessed on August 9, 2021.

<sup>172</sup> See my workpapers.

<sup>173</sup> Alexandra Chang, “Microsoft Officially Announces Windows 8 for October,” *Wired*, July 9, 2012, available at <https://www.wired.com/2012/07/microsoft-officially-announces-windows-8-for-october/>; Brad Chacos, “Can the Windows Store possibly be ready by Oct. 26?,” *PCWorld*, October 1, 2012, available at <https://www.pcworld.com/article/2010853/can-the-windows-store-possibly-be-ready-by-oct-26.html>

<sup>174</sup> Tom Warren, “Windows Store rebranded to Microsoft Store in Windows 10,” *The Verge*, September 22, 2017, available at <https://www.theverge.com/2017/9/22/16348986/microsoft-store-windows-10-app-store>, accessed on August 8, 2021.

<sup>175</sup> Jonathan Borck, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 2020, available at [https://www.analysisgroup.com/globalassets/insights/publishing/apples\\_app\\_store\\_and\\_other\\_digital\\_marketplaces\\_a\\_comparison\\_of\\_commission\\_rates.pdf](https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf), accessed on August 10, 2021, Appendix A1.

<sup>176</sup> Chuong H Nguyen, “Microsoft wants a bigger cut of the revenue from Windows developers”, *Windows Central*, November 20, 2014, available at <https://www.windowscentral.com/microsoft-wants-bigger-cut-revenue-windows-developers>, accessed on August 10, 2021; Microsoft Store, “App Developer Agreement,” July 10, 2020 (“2020 Microsoft



January 1, 2015, it charged a 20 percent commission rate to developers after \$25,000 in sales through the Microsoft Store; however, Microsoft dropped this lower commission rate starting January 1, 2015.<sup>177</sup> Starting on October 26, 2017, Microsoft implemented different rules for game and non-game apps.<sup>178</sup> Until recently, Microsoft charged a 30 percent headline commission rate on game transactions provided by the Microsoft Store.<sup>179</sup> As of August 1, 2021, PC game transactions on the Microsoft Store will be subject to a 12 percent commission rate.<sup>180</sup> Since October 26, 2017, non-game PC app transaction on the Microsoft Store have been subject to a headline commission rate of 15 percent, and in some instances developers of non-game PC apps could obtain a lower commission rate.<sup>181</sup> For example, from March 5, 2019 to January 14, 2020, PC non-game app transactions on the Microsoft Store were subject to a commission rate of either 5 or 15 percent, depending on how a user accessed the app's page.<sup>182</sup> On June 24, 2021, Microsoft announced that beginning July 28, 2021, it would no longer charge a commission for non-game PC apps on the Microsoft Store if an app developer utilized its own payment system or a third-party payment system.<sup>183</sup>

99. [REDACTED]

App Developer Agreement”), available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4o4bH>, accessed on August 8, 2021, p. 46.

<sup>177</sup> Sean Hollister, “Windows Store launch details: late February, \$1.49 minimum price, 80% revenue share after \$25K sales”, *The Verge*, December 6, 2011, available at <https://www.theverge.com/2011/12/6/2616731/microsoft-windows-store-pricing-149-70-80-percent>, accessed on August 10, 2021; Chuong H Nguyen, “Microsoft wants a bigger cut of the revenue from Windows developers”, *Windows Central*, available at <https://www.windowscentral.com/microsoft-wants-bigger-cut-revenue-windows-developers>, accessed on August 10, 2021.

<sup>178</sup> 2020 Microsoft App Developer Agreement, p. 46.

<sup>179</sup> 2020 Microsoft App Developer Agreement, pp. 14–15 (“Fifteen percent (15%) of Net Receipts for any Apps (and any In-App Products in such Apps, including) that are not listed [next]... Thirty percent (30%) of Net Receipts for: (a) all Apps and In-App Products acquired by Customers in the Microsoft Store on an Xbox console and billed to such Customers on a non-subscription basis; (b) all Games (and In-App Products in Games) regardless of platform of acquisition.”); Expert Rebuttal Report of Lorin Hitt, Ph.D., March 15, 2021 (“Hitt *Epic* Report”), ¶ 336.

<sup>180</sup> Tom Warren, “Microsoft shakes up PC gaming by reducing Windows store cut to just 12 percent,” *The Verge*, April 29, 2021, available at <https://www.theverge.com/2021/4/29/22409285/microsoft-store-cut-windows-pc-games-12-percent>, accessed on July 9, 2021; Microsoft Store, “App Developer Agreement,” June 28, 2021 available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4OG2b>, accessed on August 8, 2021.

<sup>181</sup> 2020 Microsoft App Developer Agreement, p. 46.

<sup>182</sup> If a user is brought directly to the app's page via a “deep link,” the transaction is subject to a 5% commission. If the user reaches the page via another page in the Microsoft store, or any other method besides a “deep link,” the transaction is subject to a 15% commission. *See*, Microsoft Store Team, “A New Microsoft Store revenue share is coming,” *Windows Blogs*, May 7, 2018, available at <https://blogs.windows.com/windowsdeveloper/2018/05/07/a-new-microsoft-store-revenue-share-is-coming/>, accessed on July 9, 2021; Microsoft Store Team, “Updated Microsoft Store App Developer Agreement: New Revenue Share,” *Windows Blog*, March 6, 2019, available at <https://blogs.windows.com/windowsdeveloper/2019/03/06/updated-microsoft-store-app-developer-agreement-new-revenue-share/>.

<sup>183</sup> K. Holt, “Microsoft Store is getting a much-needed overhaul for Windows 11,” *engadget*, June 24, 2021, available at <https://www.engadget.com/windows-11-microsoft-store-redesign-154155457.html>, accessed on July 27, 2021.

#### 5.5.2.5 *Epic Games Store*

100. The Epic Games Store launched in December 2018.<sup>187</sup> In 2020, consumers spent approximately \$700 million on game transactions through the Epic Games Store, of which \$265 million was for game transactions with third-party developers.<sup>188</sup> The Epic Games Store has not yet turned a profit.<sup>189</sup> Epic does not charge developers a fixed fee for accessing app distribution on Epic Games Store besides commissions, but charges a 12 percent commission fee on sales.<sup>190</sup> In addition, Epic charges developers a 5 percent fee for games developed using its Unreal Engine, which it waives for game sales through the Epic Games Store.<sup>191</sup> The Epic Games Store offers free apps; however, free apps only constitute 9.5 percent of all apps on the Epic Games Store.<sup>192</sup>

<sup>184</sup> Microsoft Presentation, “Microsoft Store Policies & App Store Principles,” January 2021, MSFT\_EPIC\_00000095 – 109 at MSFT\_EPIC\_00000103 – 104 shows the FY2020 “Est. Gross Sales” for each of the “Partner App/Company,” as well as a percentage of the total “FY2020 Est. Gross Sales” for the Microsoft/Xbox Stores.

<sup>185</sup> [REDACTED] See Microsoft Presentation, “Microsoft Store Policies & App Store Principles,” January 2021, MSFT\_EPIC\_00000095 – 109 at MSFT\_EPIC\_00000104.

<sup>186</sup> Microsoft Presentation, “Microsoft Store Policies & App Store Principles,” January 2021, MSFT\_EPIC\_00000095 – 109 at MSFT\_EPIC\_00000103 – MSFT\_EPIC\_00000104.

<sup>187</sup> Kyle Orland, “Epic Games Store launches with extremely limited selection of games,” *ArsTechnica*, December 6, 2018, available at <https://arstechnica.com/gaming/2018/12/epic-games-store-launches-with-extremely-limited-selection-of-games/>, accessed on August 9, 2021.

<sup>188</sup> Epic Games, “Epic Games Store 2020 Year in Review,” January 28, 2021, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-2020-year-in-review>, accessed on August 9, 2021.

<sup>189</sup> Deposition of Steven Allison (Epic), Volume I, February 9, 2021, pp. 89–90 (“Q. ... And to date, EGS is still not profitable; is that correct? A. We are still investing in the business and growing, and we are not a profitable business because we are in growth mode and investing, nor is that our goal. ... I think 2023 is when we expect the current operating plan to -- to get us to break even to slight profitability.”).

<sup>190</sup> Schmalensee Report Exhibit 5.B.

<sup>191</sup> Epic Games, “Welcome to Epic Games,” available at <https://www.epicgames.com/store/en-US/about>, accessed on August 9, 2021 (“If your game is built using Unreal Engine, Epic will cover your engine royalties on Epic Games store revenue.”).

<sup>192</sup> Schmalensee Report Exhibit 5.D,

101. According to Epic's CEO, Tim Sweeney, the Epic Games Store intentionally keeps the selection of games on the platform small for consumers.<sup>193</sup> It often offers exclusive partnerships to developers.<sup>194</sup> In 2020, the Epic Games Store offered 471 games to consumers.<sup>195</sup>

#### 5.5.2.6 *Discord Store*

102. The Discord Store launched in August 2018 as a limited beta version in Canada and then launched a public beta version more broadly on October 16, 2018.<sup>196</sup> In December 2018, Discord announced it would charge developers a 10 percent commission rate starting in 2019.<sup>197</sup> By March 2019, Discord announced it would not operate a store and focus on its Nitro subscription service instead, although developers would still be able to sell games within their own developer Discord servers.<sup>198</sup> Six months later, in September 2019, Discord also abandoned the game apps part of its subscription service.<sup>199</sup>

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<sup>193</sup> Kyle Orland, "Epic CEO: 'You're going to see lower prices' on Epic Games Store," *ArsTechnica*, March 20, 2019, available at <https://arstechnica.com/gaming/2019/03/epic-ceo-youre-going-to-see-lower-prices-on-epic-games-store/>, accessed on August 9, 2021 ("Sweeney said that the limited game selection on the Epic Games Store so far was a 'conscious effort... to release games at a pace where we were confident each game could find an audience. If we released thousands of games on day one, they would crowd each other out.'").

<sup>194</sup> Kyle Orland, "Why one PC developer turned down the security of Epic's exclusivity offer," *ArsTechnica*, August 19, 2019, available at <https://arstechnica.com/gaming/2019/08/why-one-pc-developer-turned-down-the-security-of-epics-exclusivity-offer/>, accessed on August 9, 2021 ("Epic seems to realize [Steam's advantages as an established marketplace] and has been relatively upfront about its strategy of using free games and exclusivity deals to build an EGS player base that can take on Steam's behemoth.").

<sup>195</sup> Epic Games, "Epic Games Store 2020 Year in Review," January 28, 2021, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-2020-year-in-review>, accessed on August 9, 2021.

<sup>196</sup> Greg Kumparak, "Discord is launching a game store," *Tech Crunch*, available at <https://techcrunch.com/2018/08/09/discord-is-launching-a-game-store/>, accessed on August 9, 2021; Nick Statt, "Discord's game store launches globally today with indie gems like Hollow Knight and Dead Cells," *The Verge*, available at <https://www.theverge.com/2018/10/16/17980810/discord-digital-game-distribution-store-steam-competitor-nitro-subscription-service>, accessed on August 9, 2021.

<sup>197</sup> Brendan Sinclair, "Discord store offering developers a 90/10 revenue split," *gamesindustry.biz*, available at <https://www.gamesindustry.biz/articles/2018-12-14-discord-store-offering-developers-a-90-10-revenue-split>, accessed on August 9, 2021.

<sup>198</sup> James Batchelor, "Discord Game Store refocuses on Nitro subscription, devs can now sell games directly," *gamesindustry.biz*, available at <https://www.gamesindustry.biz/articles/2019-03-14-discord-game-store-refocuses-on-nitro-subscription-as-servers-allow-devs-to-sell-games-directly>, accessed on August 9, 2021.

<sup>199</sup> Welch Chris, "Discord gives up on subscription games because no one was playing them," *The Verge*, available at <https://www.theverge.com/2019/9/13/20864278/discord-nitro-games-subscription-bundle-discontinued>, accessed on August 9, 2021.



### 5.5.3.2 Microsoft Store for Xbox

105. The Xbox Live Marketplace launched in 2006, and after being re-branded, Xbox games are now transacted through the Microsoft Store on Xbox.<sup>206</sup> The store sells games and non-game apps for use on Xbox devices in categories such as sports, entertainment, and music.<sup>207</sup>

106. Prior to 2021, the Microsoft Store on Xbox charged a 30 percent commission on all transactions for and within game apps.<sup>208</sup> Currently, it charges a 30 percent commission on game transactions and one-time purchases of non-subscription content in non-game apps, and a 15 percent commission rate on subscription-based purchases in non-game apps.<sup>209</sup> [REDACTED]

[REDACTED]

[REDACTED]

### 5.5.3.3 Nintendo eShop

107. The Nintendo eShop launched June 6, 2011.<sup>211</sup> Developers can offer apps for the Nintendo 3DS, the Wii U, and the Nintendo Switch through the Nintendo eShop.<sup>212</sup> The Nintendo eShop mostly offers game app transactions; however, developers of certain

<sup>206</sup> GamesIndustry International, “Microsoft Unveils Xbox Live Marketplace Content Available at Launch of Xbox 360,” November 15, 2005, available at <https://www.gamesindustry.biz/articles/microsoft-unveils-xbox-live-marketplace-content-available-at-launch-of-xbox-360>, accessed on July 31, 2021; Matt Brown, “Xbox Store rebranding to ‘Microsoft Store’ on Xbox One,” September 28, 2017, *Windows Central*, available at <https://www.windowscentral.com/xbox-store-rebranded-microsoft-store>, accessed on July 31, 2021.

<sup>207</sup> Microsoft Store, “Netflix,” available at <https://www.microsoft.com/en-us/p/netflix/9wzdncrfj3tj?activetab=pivot:overviewtab>, accessed on July 30, 2021; “ESPN Xbox,” Microsoft Store, available at <https://www.microsoft.com/en-us/p/espn-xbox/9nb4d3vwkb55?activetab=pivot:overviewtab>, accessed on July 30, 2021; “Spotify | Xbox,” Microsoft Store, “Spotify | Xbox,” available at <https://www.microsoft.com/en-us/p/spotify-xbox/9nfq49h668tb?activetab=pivot:overviewtab>, accessed on July 30, 2021.

<sup>208</sup> 2020 Microsoft App Developer Agreement (“Fifteen percent (15%) of Net Receipts for any Apps (and any In-App Products in such Apps, including) that are not listed [next]... Thirty percent (30%) of Net Receipts for: (a) all Apps and In-App Products acquired by Customers in the Microsoft Store on an Xbox console and billed to such Customers on a non-subscription basis; (b) all Games (and In-App Products in Games) regardless of platform of acquisition.”).

<sup>209</sup> Microsoft Store, “2021 App Developer Agreement,” June 28, 2021 (“2021 Microsoft App Developer Agreement”), available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4OG2b>, accessed on August 8, 2021, Section 6b.

<sup>210</sup> Microsoft Presentation, “Microsoft Store Policies & App Store Principles,” January 2021, MSFT\_EPIC\_00000095 at MSFT\_EPIC\_00000104.

<sup>211</sup> Hayley Tsukayama, “Nintendo eShop to launch June 6,” *The Washington Post*, May 12, 2011, available at [https://www.washingtonpost.com/blogs/faster-forward/post/nintendo-eshop-to-launch-june-6/2011/05/12/AFcwWM1G\\_blog.html](https://www.washingtonpost.com/blogs/faster-forward/post/nintendo-eshop-to-launch-june-6/2011/05/12/AFcwWM1G_blog.html), accessed on July 27, 2021.

<sup>212</sup> Nintendo, “Buy digital: Download and play today,” available at <https://www.nintendo.com/games/buy-digital/>, accessed on August 9, 2021; Nintendo, “Nintendo Store,” available at <https://store.nintendo.com/>, accessed on August 9, 2021.

entertainment apps, such as Hulu, also transact through the Nintendo eShop.<sup>213</sup> The platform generated \$3.2 billion in digital sales in Nintendo's 2021 financial year.<sup>214</sup> The Nintendo eShop charges developers a 30 percent commission rate and does not charge an annual developer fee.<sup>215</sup>

### ***5.6. Direct distribution by developers***

108. Developers can also choose to offer apps and app content to consumers through direct distribution. Developers can distribute apps directly to consumers for certain types of devices, including Macs, Windows PCs, and Android devices. Some large game developers have set up storefronts for distributing games directly to consumers; for example, EA has set up Origin and Activision Blizzard has set up Blizzard Battle.net.<sup>216</sup> In addition, some developers directly distribute games to consumers on platforms that also offer transactions for third-party developers; for example, Epic offers both its own games and third-party game transactions through the Epic Games Store while Valve offers both its own games and third-party game transactions through Steam.<sup>217</sup>

## **6. PLAINTIFFS' EXPERTS' CONCLUSIONS REGARDING COMMON IMPACT AND DAMAGES CRUCIALLY RELY ON FLAWED ASSUMPTIONS ABOUT THE BUT-FOR COMMISSION RATE THAT CONTRADICTS COMPETITIVE REALITY**

109. Having analyzed the details of the commission rates and other contractual terms provided by the App Store and other app transaction platforms, I now address the flaws in Plaintiffs' experts' conclusions regarding the commission rates that would prevail in the but-for world.

110. Professor Elhauge states that "evidence common to the class indicates that all [developer] class members paid an anticompetitively inflated commissions [sic] to Apple

<sup>213</sup> Nintendo, "Hulu for Nintendo Switch," available at <https://www.nintendo.com/games/detail/hulu-switch/>, accessed on August 9, 2021.

<sup>214</sup> Nintendo Life, "Nintendo eShop Growth Continues With Massive Increases to Digital Sales," May 6, 2021, available at [https://www.nintendolife.com/news/2021/05/nintendo\\_eshop\\_growth\\_continues\\_with\\_massive\\_increase\\_to\\_digital\\_sales](https://www.nintendolife.com/news/2021/05/nintendo_eshop_growth_continues_with_massive_increase_to_digital_sales), accessed on August 9, 2021.

<sup>215</sup> Nintendo, "Retail Activation Ticket Schedule to Nintendo Switch Content License and Distribution Agreement (Japan)," NOA-EPIC-APPLE\_000148 – 55 at NOA-EPIC-APPLE\_000148; Jonathan Borck et al., "Apple's App Store and Other Digital Marketplaces," *Analysis Group*, July 22, 2020.

<sup>216</sup> Origin, "Store," available at <https://www.origin.com/usa/en-us/store>, accessed on August 9, 2021; Battle.net, "Shop," available at <https://us.shop.battle.net/en-us>, accessed on August 9, 2021. See also Economides Report, Table 4.

<sup>217</sup> Epic Games, "Epic Games Store 2020 Year in Review," January 28, 2021, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-2020-year-in-review>, accessed on August 9, 2021; Steamworks, "Steamworks," available at <https://partner.steamgames.com/>, accessed on August 9, 2021. See also Economides Report, Table 4.



during the class period.”<sup>218</sup> While Professor Elhauge does not provide an explicit methodology for determining impact or quantifying damages for proposed developer class members, he claims that, in general, additional competition from iOS app transaction platforms in the but-for world would reduce Apple’s commission rates.<sup>219</sup> Professor Economides, on the other hand, claims to provide a methodology for calculating damages for the proposed developer class. He does not expressly discuss classwide impact as distinct from his methodology for calculating damages, and instead stated in deposition that he was *assuming* classwide impact.<sup>220</sup> He also stated that he assumed Apple was liable for the challenged conduct based on Professor Elhauge’s report but that his opinion about classwide impact was independent of Professor Elhauge’s opinion on classwide impact.<sup>221</sup> Finally, Professor McFadden claims to provide a methodology for determining common impact and calculating damages for the proposed consumer class.<sup>222</sup>

111. Central to all three of Plaintiffs’ experts’ opinions regarding impact and/or damages is their claims that commissions would have been uniformly lower but-for Apple’s challenged

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<sup>218</sup> Elhauge Report, ¶ 16.

<sup>219</sup> Elhauge Report, ¶ 14 (“By completely prohibiting *all* competition in the iOS app distribution market, Apple has caused the maximum possible amount of anticompetitive harm in this market, therefore anticompetitively inflating Apple’s profit-maximizing average commission for its iOS App Store. ... Apple would have faced significantly more competition from rival iOS app distributors and direct distribution of iOS apps but for its challenged conduct.”); Elhauge Report, ¶ 15 (“Further, all the methodologies that I use and conclusions that I reach regarding the effect on commissions pertain to the effect of competition on the App Store’s average profit-maximizing commission, and thus are inherently common to the developer class.”); Elhauge Report, ¶ 16 (“In the but-for world, Apple would most likely adjust its entire commission structure downward, which would necessarily reduce all class members’ commissions.”).

<sup>220</sup> Economides Deposition, pp. 27:22–28:7 (“Q. Okay. Have you been asked to determine whether Apple’s alleged conduct injured every developer in the class from that time forward? A. Yes. Q. Are you assuming that Apple’s conduct has injured the named plaintiffs? A. Yes. Q. Are you assuming that Apple has injured any other specific developer? A. I’m assuming that the developers in the class all got injured.”); p. 36:7–14 (“Well, when we say we -- everyone was injured, that means everyone was injured some amount of money, like at least 1 cent, you know. If you’re asking me does a calculation say it’s exactly 1 cent or 10 cents, or something like that, the answer is no. But the fact that everyone was injured is there, in my economic opinion.”).

<sup>221</sup> Economides Deposition, p. 29:21–25 (“Q. Are -- are you assuming that Apple is liable for such conduct? A. I have said that my assumption on liability is based on Professor Elhauge’s report and I rely on that -- on that report.”); p. 31:6–20 (“Are you instead saying that you actually have concluded that Apple is liable for anticompetitive conduct, or are you just saying that you’re assuming Professor Elhauge is right? ... THE DEPONENT: Well, I -- my task was -- is to assume liability for Apple and then go on from there. Now, the specific liability of Apple is explained in detail in Professor Elhauge’s report. I did not replicate his report. I did not go into every line of his analysis and say, well, that’s correct. So I understand that his report establishes liability and I go on from there.”); pp. 36:25–37:17 (“Q. Okay. Do you understand Professor Elhauge to offer the opinion that Apple’s conduct injured 100 percent of the members of the alleged developer class? A. Yes. Q. Do you rely on Professor Elhauge’s opinion on that point? A. No. I -- I rely on my own analysis and my economic analysis for that very similar statement or same statement. Q. If Professor Elhauge turns out to be incorrect in his opinion on class by injury, would you still hold your own opinion? A. If he turns out to be wrong on what opinion? Q. His opinion that 100 percent of class members have been injured by Apple’s conduct. A. Yes, of course, I will stay with my opinion because my opinion is independently derived and it’s reliable. It’s done through the usual, well-established economic methods. And I would rely on my opinion as an economist, not on Professor Elhauge’s opinion that you mentioned.”).

<sup>222</sup> Expert Report of Daniel L. McFadden In Support of Plaintiff’s Motion for Class Certification, June 1, 2021, (“McFadden Report”), ¶ 14 (“While the extent of the harm to each [consumer] class member will depend on their individual purchases, common economic evidence demonstrates a quantifiable pattern of impact on all class members.”).



conduct. They do not properly consider (or consider at all) other possible marketplace changes in the but-for world that would also affect whether members of both the proposed developer and consumer classes have been impacted by Apple's challenged conduct. I discuss this further in Section 8, where I demonstrate that individualized inquiry would be necessary to determine impact, and calculate any damages, from the challenged conduct. In this Section, I address Plaintiffs' experts' claims regarding the but-for commission rate.

112. Both Professor Economides and Professor McFadden start by asserting a "but-for" commission that they propose would have been charged for *all* iOS app transactions in the but-for world. In contrast, Professor Elhauge does not provide estimates of but-for commission rates but claims that "Apple and its rival iOS app distributors would have varying profit-maximizing commissions in the but-for world because: (i) their products would be vertically differentiated; and (ii) they would likely have different business strategies."<sup>223</sup> Both Professor Economides and Professor McFadden observe the same historical and present app transaction commission rates I exhibited above (which show both the prevalence of a 30 percent headline rate and different variations from that rate in different circumstances). Yet, using what they say are "benchmark" or "yardstick" methods, each offers the opinion that there would have been *uniform* commission rates for all apps that were much lower than what is typically charged by existing app transaction platforms. Professor Economides starts by claiming these headline rates would be either 13.0 percent, 14.5 percent, or 14.8 percent, depending on which method he uses to determine the but-for commission rate.<sup>224</sup> He then assumes that Apple would use two rate tiers in the but-for world, and splits the headline but-for commission rates previously calculated into two commission rates through a basic calculation by assuming that Apple would either keep a 2:1 commission rate ratio (as with its current 30 percent and 15 percent commission rate levels), or it would keep the "ratio of profits between the two tiers" the same.<sup>225</sup> The low tier rates, calculated from the headline rate without additional empirical evidence or modelling, range from 6.8 percent to 9.0 percent. The high tier commission rates range from 13.5 to 15.6 percent.<sup>226</sup> Professor McFadden, on the other hand, claims the headline (and only) commission rate would have been identical for all iOS app transactions at either 10 percent or 12 percent.<sup>227</sup> Thus, each is offering the opinion that the "but-for" iOS commission rate for all transactions would have been well below any commission rate that was offered by any app transaction

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<sup>223</sup> Elhauge Report, ¶ 325.

<sup>224</sup> Economides Report, Table 7.

<sup>225</sup> Economides Report, Section II.D. See Section 6.2.1.7 for an explanation on why the two tier structure in Professor Economides' approach is fatally flawed and follows entirely from a single average but-for commission rate.

<sup>226</sup> Economides Report, Table 7.

<sup>227</sup> McFadden Report, ¶ 161 ("I use 10-12 percent as the But-For commission rates.").

platform prior to 2018 and is lower than all actual commission rates on app transaction platforms today other than for a select subset.<sup>228</sup>

113. Having assumed that every single iOS app transaction platform would have charged, and every developer would have paid, these “benchmark/yardstick” but-for commission rates, Professor Economides and Professor McFadden then opine as to whether all proposed developer and consumer class members would have been impacted or damaged. Specifically, each claims that he has a method that can determine whether, and by how much, these assumed but-for commission rates would impact and damage every proposed class member.

- Professor Economides’ approach is simple: he assumes that the entirety of the decline represented by his proposed but-for lower commission rates would accrue directly to proposed developer class members in the form of impact and damages (i.e., there is no developer competition and developers would not pass through lower commissions in the form of lower app prices to consumers).<sup>229</sup>
- Professor McFadden, in direct contrast, offers a model he claims can show that but-for prices to proposed consumer class members would be changed by developers lowering their prices. In his opinion, almost all developers pass through a large amount of the commission reduction that Professor McFadden assumes.<sup>230</sup>

114. Professor Elhauge does not quantify any but-for commission rate, instead relying on (but not verifying) the but-for commission rates calculated by Professor Economides.<sup>231</sup> Rather, he claims that but-for the challenged conduct, Apple would have faced “significantly more competition” in the distribution of iOS apps.<sup>232</sup> He claims that various rivals would have entered the market, both via new iOS app transaction platforms and via direct

<sup>228</sup> See Figure 19, Figure 20, and Figure 21.

<sup>229</sup> Economides Report, ¶¶ 71–76.

<sup>230</sup> McFadden Report, ¶ 13.

<sup>231</sup> Elhauge Deposition, pp. 140:20–141:6 (“Q. And have you verified the accuracy of Professor Economides’ calculations for the Windows yardstick? A. No. My -- as I say in my report, that was a conclusion I offer on the premise that if -- if his analysis were found to be reliable by the finder of fact, it would produce the conclusion that I -- I draw from it. Q. Are you offering the opinion that his Windows yardstick is reliable? A. I am not independently assessing his yardstick.”); p. 181:14–25 (“I just conclude that it is -- would be some reduction with an increased competition. Now, if you -- you know, if you adopt one of the methods, say, of Professor Economides, you can then figure out what the minimum harm would be. It would be the difference between the actual commission rate and the but-for commission rate. That would be the minimum amount of harm multiplied by the sales of every individual developer. But I myself haven’t made that quantification. My opinion is just that all of them were harmed to some extent.”); p. 259:19–21 (“So I haven’t second-guessed or, you know, tried to independently validate the yardstick that Professor Economides uses.”). Professor Elhauge also does not opine on pass through. Elhauge Report, ¶64, footnote 61 (“While my market definition analysis accounts for the theoretically [sic] possibility that a developer might pass on a portion of the commission increase to consumers in the form of higher app prices, I offer no opinion on whether in this case there would actually be any such pass through given the economics of this market and the fact that apps are typically priced at \$0.99 tiers.”).

<sup>232</sup> Elhauge Report, ¶ 298.

distribution.<sup>233</sup> Further, he claims that this increased competition would have reduced Apple's *average* commission rate because Apple and its rivals would not have perfectly coordinated to all charge Apple's existing commission rates, thus on *average* but-for rates would be lower.<sup>234</sup> As noted previously, and in contrast to Professor Economides and Professor McFadden, within this purported lower average commission rate he claims there would be diversity in commissions charged because "in the but-for world, profit-maximizing commissions would vary significantly between different iOS app distributors due to firm asymmetries."<sup>235</sup> He notes as evidence the diversity of rates found in the "Windows and macOS distribution markets."<sup>236</sup> Yet, he does not offer a method to determine which developers and consumers within this average would in fact transact at lower commission rates. Like Professor Economides and Professor McFadden he also fails to note the prevalence of a 30 percent headline commission rate charged by participants in these claimed benchmark "markets." Finally, Professor Elhauge claims that "*all* class members paid an anticompetitively inflated commission" because in the but-for world Apple would have most likely adjusted its entire commission structure downward, thus reducing commissions to all developers.<sup>237</sup> Professor Elhauge does not reconcile this claim with the empirical fact that in his two benchmark "markets" (Windows and macOS app distribution) the 30 percent headline commission rate remains, even though these two "markets" are "relatively unconstrained by anticompetitive conduct."<sup>238</sup>

***6.1. Plaintiffs' experts' analyses are based on assumptions regarding the central empirical question in this matter***

115. Professor Economides, Professor McFadden, and Professor Elhauge's proposed methodologies for establishing common impact and calculating damages are contrary to market realities, including the fact that most transaction platforms charge a headline commission rate of 30 percent, as described in Section 5.5. Instead, they each rely on speculation or a set of key simplifying assumptions that in essence lead them to assume their conclusions of common impact and damage rather than to empirically establish them.

116. The relevant questions are, in the absence of Apple's challenged App Store rules:

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<sup>233</sup> Elhauge Report, Section IV.A.

<sup>234</sup> Elhauge Report, Section IV.B.

<sup>235</sup> Elhauge Report, ¶ 324.

<sup>236</sup> Elhauge Report, ¶ 334. Professor Elhauge claims that "the two markets that are most similar to the iOS app distribution market, but are relatively unrestrained by anticompetitive conduct, are the Windows and macOS app distribution markets."

<sup>237</sup> Elhauge Report, Section V.

<sup>238</sup> Elhauge Report, ¶ 334.

- What kind of additional competition would have been present in the form of new iOS app transaction platforms as well as from direct distribution of iOS apps from developers to consumers?
- How would this affect the commissions (and transaction quality) offered by different app transaction platforms and available to developers and consumers for iOS app transactions?
- In turn, where would any given developer and consumer have chosen to transact and at what price?

117. Plaintiffs' experts skip over offering any rigorous method to answer these questions, consistent with market facts or consistent with the 30 percent headline commission rate charged by most app transaction platforms. Nor do they offer any rigorous model that addresses iOS app transaction platform competition in the context of two-sided markets.<sup>239</sup>

118. Instead, each simply assumes, contrary to market facts, that but-for commission rates for every single iOS app transaction would have been lower than the 30 percent commission rate charged on most app transaction platforms. Professor Economides and Professor McFadden further assume that but-for commission rates for every single iOS app transaction would have been uniformly (and dramatically) lower, by a fixed, specified amount.<sup>240</sup> The fundamental problem is that nothing in the real world supports the assumption that all iOS app transaction platforms (including the App Store) in the but-for world would have charged lower commission rates for every iOS app transaction than in the actual world. To the extent commission rates may have been lower for some app transactions, there is no basis in reality to assume commission rates would have been lower for all, or commonly lower. To the contrary, every established app transaction platform observed in the real world (operating in a manner absent Apple's alleged anticompetitive conduct), and on which the Plaintiffs' experts rely as a benchmark, directly *contradicts* this assumption, and nearly all charge a headline 30 percent commission rate.<sup>241</sup> For this reason alone, their analyses are entirely without merit.

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<sup>239</sup> Professor Economides attempts to introduce a formulaic approach in one of his methodologies that simply assumes, with no evidence, that two additional iOS app transaction platforms would enter and each would achieve a 25 percent share of iOS transactions. This approach does not and cannot account for competition and instead assumes what the *outcome* of the presumed competition would be. See Economides Report, ¶¶ 40–55 for details.

<sup>240</sup> As noted above, Professor Elhauge has the contradictory opinion that “in the but-for world, profit-maximizing commissions would vary significantly between different iOS app distributors due to firm asymmetries.” Elhauge Report, ¶ 324. He further claims that: “Apple and its rival iOS app distributors would have varying profit-maximizing commissions in the but-for world because: (i) their products would be vertically differentiated; and (ii) they would likely have different business strategies.” Elhauge Report, ¶ 325.

<sup>241</sup> This holds even for app transaction platforms for which it may seem like the commission rate is the same for all developers. The Epic Games Store, for example, has a “headline” commission rate of 12 percent. However, an analysis of

119. Plaintiffs’ experts’ flawed assumptions of uniform but-for commission rates that are lower than the predominant 30 percent commission rate in the real world lead them to incorrectly conclude that all proposed developer class members and nearly all proposed consumer class members were impacted by Apple’s challenged conduct. If they had instead assumed that but-for commission rates resembled commission rates from other actual app transaction platforms (such as the 30 percent headline commission rate found on many app transaction platforms) over the class period, Plaintiffs experts would necessarily have concluded that a substantial number of proposed developer and consumer class members were in fact unharmed by Apple’s challenged conduct. This is because, as discussed extensively in Section 5.5, current headline commission rates on these “more competitive” other app transaction platforms were, and generally continue to be, 30 percent.

120. Additionally, as I show in Section 8.1, Plaintiffs’ experts would have found that to identify which proposed developer and consumer class members (if any) were harmed by Apple’s challenged conduct would depend, at a minimum, on determining the individualized circumstances that would lead a developer to be likely to have the option, and the desire, to transact on other platforms that offer transactions at lower commission rates. The amount of harm (if any) would depend on the mix of commissions across iOS app transaction platforms and the choices of developers and consumers to transact on these platforms at these different commission rates. Plaintiffs offer no model of how such a choice would occur. Such an analysis, were it to reflect the actual world presented in every one of Plaintiffs’ “benchmarks,” would indicate that different developers and consumers would make different choices.

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the contracts between Epic Games and various app developers shows significant variation in the contract terms that developers receive. For example,

As another example,

***6.2. Professor Economides and Professor McFadden’s claims of average but-for commission rates of 10 to 14.8 percent for all transactions contradicts the actual commission rates charged on the benchmark platforms they study***

121. As previously discussed, almost all actual app transaction platforms (which are not subject to Apple’s alleged anticompetitive behavior) are characterized by headline commission rates of 30 percent, with lower commission rates for only a subset of transactions.<sup>242</sup> In direct contradiction to these facts, Professor Economides and Professor McFadden have assumed that in the but-for world all proposed class member developers would have paid average commission rates of less than half that amount: somewhere between 10.0 and 14.8 percent. Professor Economides goes further: because he imposes a modeling structure such that Apple *must* charge two tiers of commission, he turns his average but-for commission rate into two but-for commission rate tiers. For his “low tier,” his model predicts but-for commission rates at levels (e.g., 6.8 percent and 7.6 percent) far lower than practically all commission rates ever observed in his PC app transaction platform benchmarks.<sup>243</sup>

122. Professor Economides and Professor McFadden cherry-pick some of the lowest commission rates charged by any app transaction platform at any point in time rather than considering actual marketplace behavior today and throughout the class period. They ignore the commission rates charged by most app transaction platforms, as well as the commission rates charged at different points in time or for different transactions within the app transaction platforms they do consider.

***6.2.1. Flaws in Professor Economides’ but-for commission rates***

123. Professor Economides conducts flawed analyses that lead him to calculate but-for commission rates for all iOS transactions that are both much lower (and more uniform, both within and across platforms) than those charged by the vast majority of app transaction platforms, which have historically operated and currently operate free of the challenged conduct.

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<sup>242</sup> See ¶¶ 78–81 and Figure 19.

<sup>243</sup> Economides Report, ¶ 59. See also Figure 19.

### 6.2.1.1 Overview of Professor Economides' methods for determining but-for commission rates

124. Professor Economides offers two approaches to determine the but-for commission rate: his “commission rate yardstick” approach and his “rival profit yardstick” approach.<sup>244</sup>

125. **“Commission rate yardstick” approach.** Professor Economides considers what he claims are effective commission rates charged by a subset of PC app transaction platforms as well as the supposed costs app developers would pay to directly distribute PC apps to consumers. In particular, he considers three third-party app transaction platforms (Steam, Epic Games Store, and the Microsoft Store) and five stores that directly distribute their own games to consumers (Steam, Epic Games Store, Battle.net, Origin, and WeGame).<sup>245</sup>

126. For the three third-party app transaction platforms, Professor Economides purports to calculate the effective commission rate in 2019 for each platform. In doing so he erases all the observed differences in commission rates across and within each platform. For Steam, rather than assessing the range of commission rates actually charged, he calculates an implied *average* effective commission rate of [REDACTED] by calculating total commissions divided by total billings in 2019 across a select set of third-party app developers that transacted on Steam.<sup>246</sup> For the Microsoft Store, he conducts a back-of-the-envelope calculation of 28 percent using numbers from an internal Microsoft presentation that shows the typical commission rates for different categories of apps on the Microsoft Store for PCs (gaming, productivity, and entertainment) and the revenue earned by Microsoft from commissions for those categories.<sup>247</sup> For the Epic Games Store, he assumes a 12 percent commission rate based on the platform’s headline commission rate.<sup>248</sup>

127. Professor Economides claims to have found that the direct distribution costs of five stores that directly distribute their own games to consumers range from 9 to 11 percent.<sup>249</sup>

<sup>244</sup> Economides Report, Sections II.C.1 and II.C.2.

<sup>245</sup> Economides Report, ¶ 38 (“To calculate a yardstick, I and my staff have identified three different online PC app stores distributing 3rd-party apps, and five different online PC app stores self-distributing apps. For the stores distributing 3<sup>rd</sup>-party apps, I have used the best estimate available of the effective rate charged by the store. For the stores self-distributing apps, I have estimated costs based on the costs incurred by the Epic Games Store.”); Economides Report, Table 4.

<sup>246</sup> Valve Document, VALVE 001393 – 522; Valve Document, VALVE 001523 – 4. See also Economides Report Backup, valve\_data\_import\_and\_analysis.do; Economides Report Backup, Valve Steam Store Effective Rates.xlsx

<sup>247</sup> [REDACTED], slides 9–10; Economides Report Backup, Economides Rate Yardstick.xlsx. Professor Economides uses several numbers from the presentation regarding sales by category and the proportion of sales at different commission rates within each category to estimate total sales and the average effective commission rate on the Microsoft Store for PC.

<sup>248</sup> In other words, Professor Economides does not actually calculate the effective commission rate for the Epic Games Store.

<sup>249</sup> Economides Report, ¶ 38 (“To calculate a yardstick, I and my staff have identified three different online PC app stores distributing 3rd-party apps, and five different online PC app stores self-distributing apps.”).



However, he does not actually use cost information from each store. Instead, he uses Epic's costs of operating the Epic Games Store and applies that to all "five" direct distribution stores.<sup>250</sup> In particular, he asserts, based on a produced Epic document showing costs for the Epic Games Store, that in 2019 fixed costs for the Epic Games Store were be [REDACTED] while variable costs were be [REDACTED]. He then infers the costs for each of the other four direct distribution stores by assuming they also face the exact same cost structure: fixed costs of [REDACTED] and variable costs of [REDACTED].<sup>251</sup> In other words, his direct distribution "costs" are no such thing: for the other four direct distribution stores, he does not use the actual costs of these stores but instead uses the costs of one store—again, the Epic Games Store—and *assumes* those stores would face similar costs. Were it not for the fact that [REDACTED] in fixed costs are amortized across different amounts of sales for each store, his method would result in distribution costs on each store would have been exactly the same and equal to the costs of running the Epic Games Store.

128. [REDACTED]  
[REDACTED]  
[REDACTED]. Instead, he once again further erases any differences across stores by averaging the stores' different commissions together. Specifically, he calculates a revenue weighted average effective commission rate across the three app transaction platforms and five direct distribution stores based on estimated total sales on each platform or store.<sup>252</sup> As with his store cost data, he does not have actual data on revenue of these different stores to create accurate weights (except for the Microsoft Store from April 2018).<sup>253</sup> Instead, he bases his calculation on an internal Microsoft presentation from May 2020 that attempted to estimate revenue on each store.<sup>254</sup>

129. Figure 22 summarizes Professor Economides' flawed and inconsistent methodology for determining the average effective commission rate for each app transaction platform or direct distribution "store" he analyzed.

<sup>250</sup> Economides Report Backup, Economides Rate Yardstick.xlsx.

<sup>251</sup> Professor Economides appears to make one exception to this formula, which is to assume that there are no fixed costs for own sales of Valve games on Steam. He provides no justification for this assumption. While he may argue that this is because there are significant sales of third-party games on Steam so Valve would incur the fixed costs of operating the platform even without the sales of Valve's own games, this is not consistent with how Professor Economides calculates the costs for own sales of games on the Epic Games Store. See Economides Report Backup, Economides Rate Yardstick.xlsx.

<sup>252</sup> See Economides Report Backup, Economides Rate Yardstick.xlsx.

<sup>253</sup> See Project Brazil Presentation, slides 9–10.

<sup>254</sup> See Microsoft Presentation, "CY2019 Game Industry Profit," May 2020, MSFT\_EPIC\_00000093 ("Microsoft Profit Presentation"), slides 44–48.





131. Under both scenarios, he assumes that the App Store and the unspecified entrant(s) would charge identical commission rates to developers.

132. With those unsupported (and demonstrably false, as discussed below) assumptions, Professor Economides finds that, algebraically, Apple would have charged a 14.8 percent commission rate if it faced one-entrant and a 13 percent commission rate if it faced two.<sup>258</sup> He claims this analysis is “extremely conservative” because the App Store would still earn a 46.8 percent profit margin.<sup>259</sup>

133. He also reports, but does not further rely upon, an alternative calculation in which Apple earns the same profit margin as the entering platform(s) (i.e., Apple earns a 44.3 percent profit margin in the one-entrant scenario or a 23.0 percent profit margin in the two-entrant scenario on the App Store). He otherwise maintains the same assumptions in his prior scenarios. Under this approach, he finds but-for commission rates of 11.1 percent and 9.0 percent, respectively.<sup>260</sup>

134. **“Two tier rate” approach.** Professor Economides asserts that Apple would necessarily charge a two-tiered commission rate on the App Store in the but-for world and hence would have a second tier of even lower rates than those calculated by his “commission rate” and “rival profit” yardsticks.<sup>261</sup> He bases this opinion on arguments made by Professor Elhauge, who asserts that Apple currently has only two commission rate tiers and that in the past Apple has decided not to add additional commission rate tiers.<sup>262</sup>

135. Professor Economides claims that it is possible to create a two-tiered commission structure by assuming that in the but-for world, as in the actual world, 90 percent of but-for iOS app transactions would be made at the “Tier 1” commission rate level (i.e., at 30 percent in the actual world) and 10 percent of App Store sales are made at the “Tier 2” commission rate level (i.e., at 15 percent in the actual world).<sup>263</sup> Recognizing that he does not know how Apple would set commission rates in the but-for world, he nevertheless assumes that Apple would either maintain a “2:1 ratio” or a “cost-based ratio” between the two commission rate

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<sup>258</sup> Economides Report, Table 6.

<sup>259</sup> Economides Report, ¶ 53.

<sup>260</sup> Economides Report, ¶ 54.

<sup>261</sup> Economides Report, ¶ 57 (“As Prof. Elhauge has shown, it is likely that Apple would also charge a two-tiered price in the but-for world, because Apple set up the two tiers.”).

<sup>262</sup> Elhauge Report, ¶366 (“Apple, its employees, and its retained experts have all acknowledged that Apple has only two commission percentage tiers.”); ¶372 (“Apple would be unlikely to create additional commission tiers in the but-for world given that it has repeatedly decided not to add additional commission tiers in the actual world.”).

<sup>263</sup> Economides Report, ¶ 58.

tiers.<sup>264</sup> He reports these two-tier commission rates for each scenario he considers in Table 7 of his report.<sup>265</sup> Using this method, Professor Economides finds that, depending on the specific sensitivity he uses, Tier 1 commission rates would range from 13.5 percent to 15.6 percent while Tier 2 commission rates would range from 6.8 percent to 9.0 percent.<sup>266</sup> This calculation is not based on economic analysis but instead applying arithmetic to construct two numbers that, when averaged, equal his effective average commission rate.

*6.2.1.2 Professor Economides' commission rate yardstick method assumes its conclusions and is unreliable*

136. Professor Economides' commission rate yardstick method is unreliable and unable to serve as proof of a common, lower commission rate in the but-for world for a variety of reasons. I discuss these in more detail in Sections 6.2.1.3–6.2.1.5.

- First, he has focused only on app transaction prices for PCs in a limited period of time and has ignored all other comparable app transaction platforms.
- Second, for the benchmark PC app transaction platforms he does assess, he has improperly represented the range of commissions charged within each app transaction platform and over time.
- Third, for the five “direct distribution” stores, he has not calculated actual direct distribution costs, but rather, arbitrarily applied costs from the Epic Games Store to each “direct distribution” store, leading to an improper average effective commission rate.
- Fourth, he has inappropriately combined the costs of direct distribution and the commission rates charged by app transaction platforms.
- Fifth, and critically, even if one limits oneself to a benchmark of these three app transaction platforms and five direct distribution stores, they themselves exhibit a large range of implied commissions including commissions similar to what Apple charged in the actual world. Professor Economides has not offered any method to determine which of those commissions any given developer would pay for any given app transaction in the but-for world. He has instead taken the extraordinary step of averaging the disparate commissions together—hence assuming his conclusion of

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<sup>264</sup> Economides Report, ¶¶ 58–60.

<sup>265</sup> Economides Report, Table 7 and ¶ 54.

<sup>266</sup> Economides Report, Table 7. Note that Professor Economides is not applying a range of commission rates in the but-for world. This range just represents the different ways that Professor Economides calculated the average effective but-for commission rates.

constant commission rates for all developers when they are in fact not common at all.<sup>267</sup>

*6.2.1.3 Professor Economides ignores other app transaction platforms that charge higher commission rates*

137. Professor Economides inexplicably ignores the many successful app transaction platforms that currently or previously (i.e., over the course of the class period) charge 30 percent headline commission rates. First, he ignores the history of the PC transaction platforms he uses as benchmarks, which have charged a 30 percent headline commission rate throughout much of the class period and many continue to do so.<sup>268</sup> Second, he ignores platforms for all other devices, such as those for Android devices, macOS computers, or game consoles.<sup>269</sup> This causes him to calculate but-for commission rates that are substantially lower than the commission rates observed in the actual world.

138. **PC App Transaction Platforms.** For the PC app transaction platforms he analyzes, Professor Economides excludes all commission rates charged prior to 2019, even though he acknowledges that these platforms charged higher commission rates prior to 2019.<sup>270</sup> He thus assumes that the most recent commission rates for a subset of PC app transaction platforms would have been present on all iOS app transaction platforms in the but-for world for the entire class period, despite the fact that these commission rates were not present through most of the developer class period for PC app transaction platforms. For example, he ignores the fact that Steam charged a 30 percent headline commission rate for a majority of the developer class period.<sup>271</sup> The Epic Games Store did not exist until December 2018 and Valve did not offer a lower commission rate on Steam for a small set of its highest-revenue-generating developers until the end of 2018.<sup>272</sup> Had Professor Economides accurately reflected changes in time in the commission rates charged by the PC app transaction platforms he analyzed, he would have found the headline third-party commission rates up until December 2018 would have been 30 percent for game apps, while the headline third-

<sup>267</sup> Economides Report Backup, Economides Rate Yardstick.xlsx. See also Economides Report, ¶ 38 and footnote 73.

<sup>268</sup> See Section 5.5.2.

<sup>269</sup> See Sections 5.5.1, 5.5.2.2, 5.5.2.6, and 5.5.3.

<sup>270</sup> Economides Deposition, pp. 125:24–126:3 (“I think for the earlier part of the period, they might have been -- I -- I've seen data that says they were charging more. So the actual 2019 number is defendant friendly. It's kind of a bit lower than earlier years.”). While Professor Economides asserts that using commission rates from 2019 is “defendant friendly,” it is actually the opposite since it results in lower commission rates in the but-for world.

<sup>271</sup> See Sections 5.5.2.1 and 5.5.2.4.

<sup>272</sup> See Sections 5.5.2.1 and 5.5.2.5.

party commission rates up until October 2017 would have been 30 percent for non-game apps.<sup>273</sup>

139. ***Android App Transaction Platforms.*** Professor Economides chooses to ignore the commission rates charged on Android app transaction platforms to determine his but-for commission rates. He argues that the commission rates charged by these platforms are “unfit as... yardstick[s] for competitive rates in the but-for world” because “Android app distribution appears to be tainted by anticompetitive conduct.”<sup>274</sup>

140. In reality, the commission rates charged on Android app transaction platforms can provide valuable insight into potential but-for commission rates as *all* the aspects of competition that Plaintiffs claim have been prevented by Apple’s challenged conduct have in fact been present for Android app transaction platforms since Google Play’s inception, at a time when it was not plausible that Google had market power.<sup>275</sup>

141. Developers and consumers have historically always been allowed to transact on alternative Android app transaction platforms besides Google Play.<sup>276</sup> As a consequence, multiple Android app transaction platforms exist, including the Amazon Appstore (run by Amazon, a retailer), the Samsung Galaxy Store (run by Samsung, a device OEM), and Aptoide (a third-party app store).<sup>277</sup> Moreover, consumers have historically been allowed to transact directly with developers by sideloading an app onto their Android device, as many consumers have done for the game Fortnite from Epic Games as well as other apps.<sup>278</sup> Thus, at a minimum, Android transaction platforms provide information about the types of

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<sup>273</sup> See Section 5.5.2.

<sup>274</sup> Economides Report, ¶ 33.

<sup>275</sup> See Section 5.5.1.1.

<sup>276</sup> The eBook Reader Blog, “7 Alternative Appstores for Your Android Tablet or eReader,” February 8, 2012, available at <https://blog.the-ebook-reader.com/2012/02/08/7-alternative-appstores-for-your-android-tablet-or-e-reader/>, accessed on July 28, 2021; App Futura, “Alternative app stores,” June 29, 2015, available at <https://www.appfutura.com/blog/alternative-app-stores/>, accessed on July 28, 2021; Karar Haider, “Best Google Play Store Alternatives,” November 29, 2015, available at <https://www.ubergizmo.com/articles/google-play-store-alternatives/>, accessed on July 28, 2021; Reporter’s Transcript of Proceedings, Epic Games Inc. v. Apple, Inc., May 3, 2021, pp. 798, 1985–1986, 2439–2440.

<sup>277</sup> See Section 5.5.1.

<sup>278</sup> Rachel Kaser, “Fortnite won’t be on Google Play, so here’s how Android users can get it,” TNW, August 3, 2018, available at <https://thenextweb.com/gaming/2018/08/03/fortnite-google-play-android-users/>, accessed on February 8, 2021 (“...you’ll have to download it directly from the Epic Games website.”). Sideloading is the process of installing an app on an Android device from anywhere other than an official app store. See Lori Grunin and Sean Hollister, “Fortnite for Android: Epic tells us why it won’t be on Google’s Play Store,” CNET, August 3, 2018, available at <https://www.cnet.com/news/want-fortnite-for-android-you-wont-get-it-from-the-google-play-store/>, accessed on February 8, 2021 (“Epic Games confirmed on Friday that it plans to bypass Google’s Play Store for the eagerly awaited Android launch of Fortnite...”).

commissions that could prevail in an environment where alternative app stores and direct consumer downloads are not prevented by Apple.

142. Professor Economides ignores these facts and instead cites five reasons from Professor Elhauge regarding why commission rates on Android app transactions are inappropriate benchmarks for the but-for commission rate.<sup>279</sup> Professor Elhauge asserts (and Professor Economides cites) that:

- “Google uses tying agreements with smartphone OEMs to get the Google Play store pre-installed and prominently displayed.”<sup>280</sup>
- “Google entered into agreements with smartphone OEMs that prohibited the pre-installation of rival Android app distributors.”<sup>281</sup>
- “Google made its dominant Chrome browser ‘warn’ Android users not to download the ‘.apk’ files that are necessary to install rival Android app distributors that were not pre-installed on their phones.”<sup>282</sup>
- “Android’s operating system restrains the installation of rival app distributors that were not pre-installed.”<sup>283</sup>
- “Rival Android app distribution has been driven out or limited.”<sup>284</sup>

143. But these arguments are not valid reasons for ignoring the commission rates charged by Android app transaction platforms. As an initial matter, neither Professor Economides or Professor Elhauge have conducted analysis showing that these five reasons have led to anticompetitive outcomes for Android app transaction platforms or supracompetitive commission rates. Instead, they simply assume that this alleged conduct by Google has led to supracompetitive commission rates and that Android app transaction platforms are therefore invalid benchmarks for the but-for commission rate on the App Store and other iOS app transaction platforms.<sup>285</sup>

144. Moreover, Google’s alleged anticompetitive behavior (as characterized by Professor Elhauge and Professor Economides) fundamentally differs from the alleged anticompetitive behavior they claim Apple has engaged in. As discussed previously, Plaintiffs assert that

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<sup>279</sup> Economides Report, ¶ 33.

<sup>280</sup> Elhauge Report, ¶ 443.1.

<sup>281</sup> Elhauge Report, ¶ 443.2.

<sup>282</sup> Elhauge Report, ¶ 443.3.

<sup>283</sup> Elhauge Report, ¶ 443.4.

<sup>284</sup> Elhauge Report, ¶ 443.5.

<sup>285</sup> Economides Report, ¶¶ 32–34.

Apple has monopolized the alleged market for iOS app transactions by requiring buyers of iOS devices to purchase apps and in-app products only through the App Store thereby preventing other iOS app transaction platforms from facilitating iOS app transactions or allowing developers to distribute iOS apps directly to consumers.<sup>286</sup> At no point do Plaintiffs or their experts allege that in the but-for world Apple would not be allowed to engage in the behavior they complain about for Android. For instance, they do not claim that Apple would be prevented from pre-installing the App Store on iOS devices or that Apple would be required to pre-install other iOS app transaction platforms on iOS devices. Similarly, they do not assert that Apple would be prevented from providing warnings to consumers when downloading apps outside of the App Store that it has not reviewed and cannot verify for authenticity, content, and security. In fact, some of Plaintiffs' experts' complaints about Android app transaction platforms are common in the PC environments that Professor Economides uses as his "yardstick." For instance, both Windows PCs and Macs typically provide security warnings to users that attempt to download unverified files.<sup>287</sup> Finally, regardless of these practices by Google, there are other Android app transaction platforms, including platforms run by large technology companies (e.g., Amazon and Samsung).

145. ***macOS App Transaction Platforms.*** Professor Economides also chooses to ignore macOS app transaction platforms such as the Mac App Store. As discussed previously, the Mac App Store charges the same commission rates as the App Store.<sup>288</sup> Ignoring these commission rates is unsupported by Professor Economides' own arguments.

146. On the one hand, Professor Economides claims that the Mac App Store *is* an appropriate benchmark. In particular, he states that the Mac App Store is subject to competition from other Mac app transaction platforms (such as Steam and the Epic Games Store) as well as from direct distribution by developers.<sup>289</sup> He also asserts that the app certification process used by Apple to ensure that macOS apps downloaded from other sources are secure is a model that Apple could adopt in a but-for world in which there were other iOS app transaction platforms besides the App Store.<sup>290</sup> Professor Elhauge also opines that "Apple

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<sup>286</sup> See Section 3.

<sup>287</sup> Microsoft Community, "Open file Security Warning – Microsoft Community," available at <https://www.avoiderrors.com/how-to-install-un-verified-app-on-windows-10/>, accessed on August 9, 2021. See also, Apple Support, "Safely open apps on your Mac – Apple Support," available at <https://support.apple.com/en-us/HT202491>, accessed on August 9, 2021.

<sup>288</sup> See Section 5.5.2.2.

<sup>289</sup> Economides Report, ¶ 37 ("The distribution of apps for the Mac OS is in many ways similar to PC app distribution. Both operating systems allow developers to distribute app through any store or directly to users, and many developers develop apps for and sell apps to both Mac users and to PC users."); ¶ 69 ("However, developers are not required to distribute their apps through the Apple App Store if they write software for the Mac.").

<sup>290</sup> Economides Report, ¶ 69 ("However, developers are not required to distribute their apps through the Apple App Store if they write software for the Mac. In fact, they can even have their software notarized in order to certify that they are a



does *not* use the challenged conduct in *macOS* app distribution,” providing further support that the Mac App Store is an appropriate benchmark.<sup>291</sup>

147. Despite this, and indicating how he has cherry-picked benchmarks to determine his but-for commission rates, Professor Economides asserts that commission rates on macOS app transaction platforms are not “accurate yardstick[s] for a competitive commission rate” because (i) macOS has a lower market share compared to Windows and (ii) the Mac App Store’s commission rates are set to match the App Store commission rates.<sup>292</sup>

148. These arguments for ignoring commission rates charged on Mac OS app transaction platforms in determining the but-for commission rates are without merit. Professor Economides provides no justification as to why the fact that Mac computers have a lower market share (17.1 percent according to Professor Economides) compared to Windows computers makes the Mac App Store an irrelevant benchmark. In addition, Professor Economides’ assertion that the Mac App Store’s commission rates are set to match the App Store commission rates does not prove that the Mac App Store’s commission rates are supracompetitive, and Professor Economides provides no reason to believe that they are.

149. Had Professor Economides analyzed the commission rates charged by the Mac App Store, rather than improperly disregarding them, he would have concluded that the commission rates on the Mac App Store are consistent with the commission rates on the (iOS) App Store. If nothing else, including the Mac App Store in his calculations would have provided another benchmark at a headline commission rate of 30 percent and in turn increased his average effective commission rate on PC app transaction platforms.

#### *6.2.1.4 Professor Economides obscures variation in commission rates for the benchmark app transaction platforms that he does study*

150. Professor Economides’ methodologies take all variation in commission rates and contractual terms across app transaction platforms and reduces it to a single average

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registered developer and not a developer of counterfeit software or malware. Thus, when users install their software outside of the Mac App Store, they can have more confidence that it is safe.”).

<sup>291</sup> Elhauge Report, ¶ 80. Professor Elhauge further claims that the macOS app distribution “market” is similar to the iOS app distribution “market” and is unconstrained by anticompetitive conduct. Elhauge Report, ¶334 (“The two markets that are most similar to the iOS app distribution market, but are relatively unconstrained by anticompetitive conduct, are the Windows and macOS app distribution markets.”).

<sup>292</sup> Economides Report, ¶ 37; Economides Deposition, p. 124:19–24 (“Q. Okay. So -- so when you use the term “prevailing,” you mean average? A. Well, in the context that you were -- were saying here, we’re trying to find the average commission rate in the but-for world, and you can add the word “prevailing” too.”).

commission rate which is then arbitrarily split into two commission rate tiers.<sup>293</sup> This approach is fundamentally unable to capture but-for world commissions and contracts because it ignores the basic fact that in the real world – including for Professor Economides’ preferred benchmark and “reliable yardstick,” Windows PC app transaction platforms’ commission rates vary across platforms, developers, and transactions.<sup>294</sup>

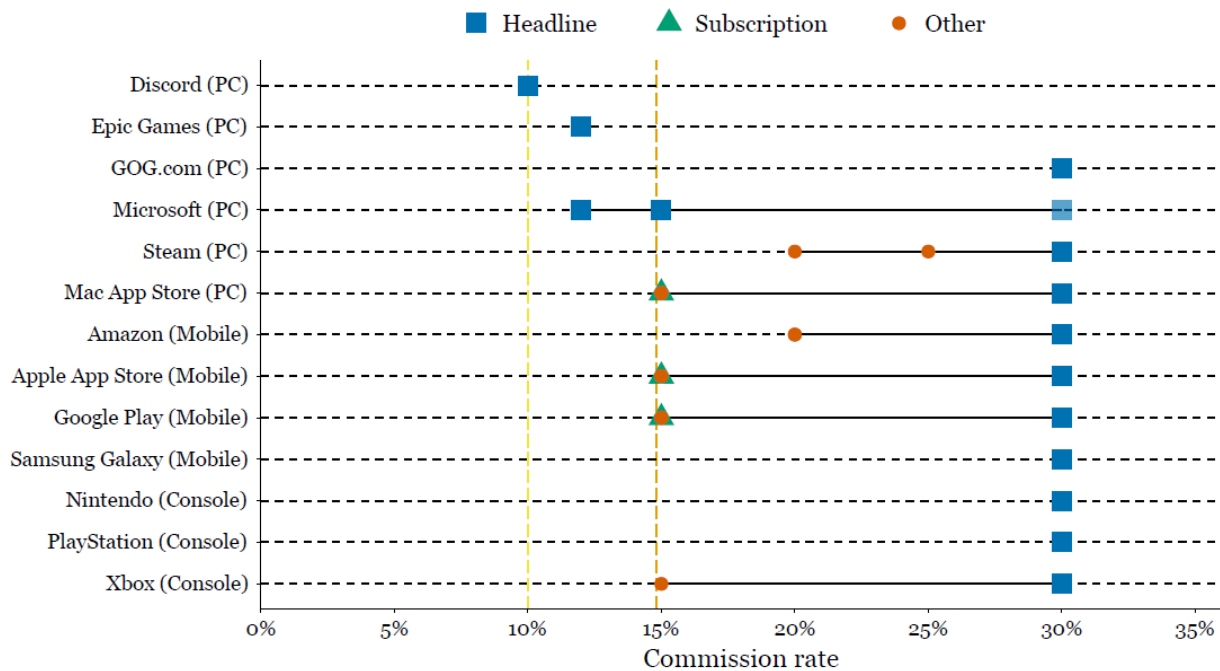
151. In Figure 23, I illustrate visually the extensive variation in current commission rates observed across app transaction platforms. As discussed in Section 5.5, the specific terms vary not only between transaction platforms but also across apps transacted on the same platform and over time on the same platform. For example, some apps pay a 30 percent commission rate on Steam while others pay 20 or 25 percent. Professor Economides’ methodology does not (and cannot) establish *which* apps would pay which rate in the but-for world. Instead, he ignores the issue entirely, and instead makes multiple assumptions that eliminates any variation in commission rates across platforms or apps:

- He averages commission rates for 2019, ignoring that terms have changed over time during the class period.
- He averages commission rates *within* a platform, ignoring the variation in standard commission rates across apps and developers on a platform at any given time
- He ignores additional contractual terms or individualized contracts, such as app-specific terms, additional payments, and more.
- He averages the commission rates across his chosen PC app transaction platforms.

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<sup>293</sup> Economides Report, Table 4.

<sup>294</sup> Economides Report, ¶ 9.

**FIGURE 23*****Distribution of current commission rates on app transaction platforms***

Source: Figure 19; Figure 20; Figure 21

Note: The other commission rate type includes discounted rates for small developers, video-based applications, and non-game subscriptions. The Microsoft Store has separate headline commission rates for game apps (at 30%, later reduced to 12% on August 1, 2021) and non-game apps (15%). The vertical yellow line denotes 10.0%, which is the lowest average effective commission rate used by any of Plaintiffs' experts. The vertical orange line denotes 14.8%, which is the highest average effective commission rate used by any of Plaintiffs' experts.

152. Figure 23 highlights just two of the dimensions ignored by Professor Economides: the variation in the commission rates for each app transaction platform and between each app transaction platforms.<sup>295</sup> This is a direct contradiction to Professor Elhauge, who recognizes in the but-for world (just like in the actual world for Professor Economides' Windows PC app transaction platforms "yardstick") that app transaction platforms would differentiate their products from rivals transaction platforms, which would lead to variation in commission rates charged across app transaction platforms.<sup>296</sup> Professor Economides' methodologies are thus unable to capture variation in commission rates that already occurs in his preferred

<sup>295</sup> Other dimensions of differentiation are discussed in Section 5.5 and include Sony and Samsung's individualized agreements with Epic, the Epic Games Store's individualized exclusivity minimum guarantees, and Epic's waving of Unreal Engine charges for games sold through the Epic Games Store.

<sup>296</sup> Elhauge Report, ¶ 432 ("In contrast, if Apple faced significant competition in the iOS app distribution market, increased investment in the App Store app recommendation algorithm could increase Apple's share of the iOS app distribution market. Second, when a firm competes against close substitutes, investments in product features can differentiate its products from its rivals' products, which tends to increase the profit-maximizing prices of all firms' products.")

“yardstick” platforms or capture the variation that Professor Elhauge contends would occur in his view of the but-for world.<sup>297</sup>

*6.2.1.5 Professor Economides inappropriately includes supposed measures of the cost of direct distribution in his calculations of the but-for commission rate*

153. Professor Economides’ average “effective” commission rate is further flawed because he concocts and includes measures of the cost of direct distribution of PC apps for five “stores.” His measures of direct distribution are without basis and his method is nonsensical.

154. First, his calculation is economically and conceptually wrong. Conceptually, even if there were direct distribution of iOS apps in the but-for world, the best measure of the but-for commission rate that the App Store and other potential iOS app transaction platforms would charge is the commission rate charged by other app transaction platforms in the actual world that compete in the presence of direct distribution – not, as Professor Economides calculates, the costs of direct distribution. Third-party distribution is not the same as direct distribution and these two modes of distribution can and have coexisted for decades. This is made apparent when one considers that there is direct distribution of PC apps in the actual world, and thus the commission rates charged by PC app transaction platforms such as Epic Games Store, Steam, and the Microsoft Store, therefore *already reflect competition with direct distribution*. Professor Economides acknowledged this at his deposition.<sup>298</sup> Moreover, as I discuss in more detail in Section 8.1.3, determining whether a developer could transact directly with consumers in the but-for world and that developer’s cost of direct distribution would require individualized inquiry. Thus, the supposed costs of direct distribution cannot be applied class wide to all proposed developer class members, as Professor Economides proposes to do based off his estimate of the Epic Games Store’s costs.<sup>299</sup>

155. While Professor Economides’ “effective commission rates” for direct distribution “stores” is based on just the limited evidence on costs from the Epic Games Store, the inclusion of these “stores” in his average effective commission rate calculation has a major impact on his results.<sup>300</sup> These “stores” have lower “effective commission rates” than the third-party PC app transaction platforms he includes in his calculation, and these “stores” account for 69 percent of the sales.<sup>301</sup> Thus, including these “stores” significantly drives down the average effective commission rate he calculates. If Professor Economides were

<sup>297</sup> Elhauge Report, ¶¶ 324–328.

<sup>298</sup> Economides Deposition, pp. 167:9–170:7.

<sup>299</sup> Economides Report, ¶ 39 and Table 4.

<sup>300</sup> Economides Report, Table 4.

<sup>301</sup> See my workpapers. See also Economides Report, Table 4.

instead to calculate the average effective commission rates charged by his three PC app transaction platforms Steam, Epic Games Store, and the Microsoft Store (which all already compete with direct distribution), it would be approximately 25.4 percent, a value in line with the App Store average commission rate on paid downloads and in-app purchases for FY2020 (27.7 percent).<sup>302</sup>

156. Professor Economides has also ignored that all of his included “direct distribution” stores are from developers with multiple dozens of games.<sup>303</sup> As I showed in Figure 6, most developers in the App Store have only released one or two iOS apps throughout the class period, so it is unlikely these developers would have the same costs as the Epic Games Store or that they could plausibly distribute their apps directly to consumers. To determine whether there would be some subset of developers that were in fact able to distribute their iOS apps directly to consumers in the but-for world, one would have to identify them and identify their actual likely costs. Professor Economides has done neither. Instead he has averaged together apples (e.g., his measure of app transaction platform commission rates) and oranges (e.g., his measure of “costs” of direct distribution for a handful of large app developers) to make an average “effective” commission rate.

157. Second, beyond the conceptual mistake of combining these disparate measures, his calculation of direct distribution costs is unreliable. Professor Economides’ calculation of the supposed cost of direct distribution for each “store” does not reflect the actual cost for those stores, nor does it represent the cost for direct distribution that would be applicable across all proposed developer class members or that the costs would even be common. Professor Economides has not even calculated the actual cost of distribution of the limited number of stores that he observes and are in operation, demonstrating the difficulty and impracticality of determining distribution costs that would apply to each developer, such as those that do not currently engage in direct distribution but might consider direct distribution in a “but-for” world.

158. Professor Economides does not actually use costs of direct distribution for each of his five “stores.” Rather he uses information on costs for the Epic Games Store (which is not

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<sup>302</sup> See my workpapers.

<sup>303</sup> For example, Valve has released multiple games including Half-Life 2, Half-Life Alyx, Team Fortress 2, Counter Strike, DoTA, and Portal2. Epic Games’ games include Unreal Tournament, Fortnite, and Rocket League. Blizzard games include StarCraft, StarCraft 2, Overwatch, and the Diablo franchise. Select EA games include the Battlefield, FIFA, and Madden franchises. Activision Blizzard, “Activision|Blizzard,” available at <https://activisionblizzard.com/home>, accessed on July 28, 2021; EA, “Electronic Arts Home Page - Official EA Site,” available at <https://www.ea.com/>, accessed on July 28, 2021; Epic Games, “Home - Epic Games,” available at <https://www.epicgames.com/site/en-US/home>, accessed on July 28, 2021; Valve, “About Us - Valve Corporation,” Valve, available at <https://www.valvesoftware.com/en/about>, accessed on July 28, 2021.

currently profitable), and does not incorporate or cite information on the cost of direct distribution for Steam, Battle.net, Origin, or WeGame. Instead, he assumes that the costs of distribution on Battle.net, Origin, or WeGame, are [REDACTED] per year plus [REDACTED], which he bases on estimates of the fixed and variable costs for the Epic Games Store.<sup>304</sup> For Steam, Professor Economides assumes that Valve faces no fixed costs for direct distribution.<sup>305</sup> Professor Economides has done no analysis on the costs for any of these four stores and does not in fact know whether or not they would be similar to the costs of the Epic Games Store.

159. One of the stores that Professor Economides includes as a direct distributor is Tencent's WeGame.<sup>306</sup> WeGame is predominately in China.<sup>307</sup> PC app distribution is subject to different competitive conditions in China compared to the U.S., and Professor Economides has provided no justification for using direct distribution of PC apps in China as a benchmark for the U.S.<sup>308</sup> Inclusion of WeGame (with his imputed Epic Games Store costs), however, has an especially large effect on Professor Economides' estimated "effective commission rate" due to the significant sales through WeGame. Excluding WeGame causes the estimated "effective commission rate" to increase from [REDACTED].<sup>309</sup>

*6.2.1.6 Professor Economides' rival profit yardstick methodology is fundamentally flawed in its approach to reaching a but-for commission rate*

160. Professor Economides' "rival profit yardstick" methodology suffers from a range of demonstrably false assumptions that make it fatally flawed for determining whether (and to what extent) proposed developer class members have been harmed by Apple's challenged conduct.

<sup>304</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx."

<sup>305</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx."

<sup>306</sup> Economides Report, Table 4.

<sup>307</sup> Tencent launched WeGame X outside of China in April 2019, however, at launch the platform had relatively few games. Jody Macgregor, "Tencent have Launched Their WeGame Client Outside China," *PCGamer* April 0, 2019 available at <https://www.pcgamer.com/tencent-have-launched-their-wegame-client-outside-china/> accessed August 9, 2021.

<sup>308</sup> Epic offered Fortnite through Tencent in China. Email discussion shows that Epic considered China to be a different market due to differences in game transaction platforms and due to government regulation restrictions. See Email from Bo Wang to Tim Sweeney et al., "Fortnite," EPIC\_01920258 – 9 at EPIC\_01920258 ("Full speed ahead on Fortnite PC, complete the necessary modifications required by the government while further explore the best approach for China operation in parallel."); Email from Martin Yu to Danny Block, et al., "Re: FNCN Concerns from Tencent Top Management Team," November 29, 2018, EPIC\_00005143 – 6 at EPIC\_00005145 ("Tencent... overlooked the differences of a western game into China market and the issue of GAPP restriction... fortnite is no way like any other game Tencent has self published so far...")

<sup>309</sup> See my workpapers.

161. Crucially, changing even one assumption in his methodology regarding other iOS app transaction platforms' market share to align with actual data results in his model predicting commission rates *above* 30 percent in his but-for world.<sup>310</sup> Rather than performing empirical analysis to model what market shares would be in the but-for world, Professor Economides assumes based on minimal justification that hypothetical iOS app transaction platforms would capture 35 percent market share (one-entrant scenario) or 50 percent total market share (two-entrant scenario).<sup>311</sup> He bases these assumptions on an internal Epic planning document from 2019 suggesting that Epic Games Store would capture 50 percent of PC app transaction revenue if Steam did not react to the launch of the Epic Games Store and a 35 percent share if Steam did react.<sup>312</sup> Based on this document, he assumes a 35 percent market share for the incoming platform in his one-entrant scenario. He further "extrapolates" from this single data point to assume, without basis, that two entrants would each capture 25 percent of the market (i.e., 50 percent total).<sup>313</sup>

162. While Professor Economides stated that he did not consider Epic Games Store's actual market share, Epic's own data show that these share assumptions are incorrect.<sup>314</sup> The Epic Games Store has not, in fact, [REDACTED] since the document Professor Economides relied upon was created. In fact, Professor Economides' own Table 4 shows that the Epic Games Store [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED].<sup>316</sup> Epic Games Stores' share is likely even lower in 2020.<sup>317</sup> Utilizing public reports from the Epic Games

<sup>310</sup> I am not asserting that commission rates would actually increase in the but-for world. Instead, this result shows how Professor Economides' approach to calculating but-for commission rates is unreliable and internally inconsistent with other assumptions he makes.

<sup>311</sup> Economides Report, ¶ 48; Economides Report Backup, “Economides Profit Yardsticks.xlsx.”

<sup>312</sup> EGS Performance and Strategy Review, EPIC\_00127277 – EPIC\_00127297 (“EGS Performance and Strategy Review”), at EPIC\_00127292.

<sup>313</sup> Economides Report, ¶ 48.

<sup>314</sup> Economides Deposition, p. 212: 16–22 (“Q. Did you do any analysis to determine if Epic actually attained a 35 percent market share with its Epic Games store? A. No. And this is not a discussion just about Epic. This is a hypothetical discussion of entry in the but-for world in the iOS app distribution market.”). Professor Economides justified not looking at Epic’s actual share because 2019 was the first year after Epic Games Stores’ entry. However, he subsequently stated in his deposition that a new entrant with a lower commission rate could achieve a high market share within a relatively short period of time. Economides Deposition, pp. 214:7–22, 219:2–9.

<sup>315</sup> Economides Report, Table 4.

<sup>316</sup> See my workpapers. See also Economides Report, Table 4. Professor Economides' Table 4 would presumably underestimate total sales of apps on PCs since he has only included three app transaction platforms and five "stores" that provide direct distribution. For instance, he excludes sales through the Mac App Store. If I were to use sales from the entire market, Epic Games Store's would be even lower.

<sup>317</sup> Professor Economides stated in his deposition that an alternative market share could be used in his rival profit yardstick method. See Economides Deposition, p. 223:1–7 (“Q. If I wanted to assume a different market share other than 35 percent



Store's 2020 "Year in Review" and Steam's total revenue for 2020, I find that Epic's revenue relative to Steam [REDACTED].<sup>318</sup> In 2019, this same ratio, using similar sources, was [REDACTED], showing that Epic Games Store [REDACTED].<sup>319</sup> It follows that Epic's share of the overall PC games market likely also fell between 2019 and 2020; therefore, updating Professor Economides' calculations for 2020 shows that his false assumption is *even farther* from reality by the end of 2020.

163. Fixing this incorrect assumption to account for Epic Games Stores' *actual* share of PC app sales shows that Professor Economides' model is entirely unreliable. While Epic Games Store's share in 2019 is at most 4.6 percent (looking only at third-party transactions) or 7.1 percent (looking at both direct distribution and third-party transactions), I conservatively consider what Professor Economides' model would predict if I assume that a potential entrant would obtain a 10 percent market share while holding all other aspects (such as the assumed profit margin for the entrant) constant. Utilizing Professor Economides' own spreadsheet, I find that his rival yardstick method predicts an unrealistic but-for commission rate of 34.6 percent in this scenario, *higher than the headline commission charged by the App Store*.<sup>320</sup> In short, correcting for Professor Economides' mistake in calculating the Epic Games Store share would have him find that no developer was harmed in the but-for world.

164. Finally, Professor Economides' assumed profit margins for entering iOS app transaction platforms is based on the profit margins of five benchmark companies (eBay, Rakuten, Alibaba, MercadoLibre, and Etsy) which are not app transaction platforms.<sup>321</sup> His only justification for why these five benchmark companies are relevant (other than having available data) is that they are a form of transaction platform that charge commissions and that they, he claims, "resemble the App Store in their operations and competitive challenges, and should likewise not have major differences in their costs and need for capital."<sup>322</sup> He

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for one entrant scenario, could I plug that different share into your model and see what the commission turns out to be? A. It could be, yeah, I mean, you could do that, but I -- I'm not sure why, but you could.").

<sup>318</sup> Epic Games Store, "Epic Games Store 2020 Year in Review," January 28, 2021; Valve Document, "Net Steam Sales, Partner Revenue Share Payments and Net to Valve: CY2015 to CY2020," VALVE\_000677.

<sup>319</sup> Epic Games Store, "Epic Games Store Weekly Free Games in 2020!," January 14, 2020, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-weekly-free-games-in-2020>; Valve Document, "Net Steam Sales, Partner Revenue Share Payments and Net to Valve: CY2015 to CY2020," VALVE\_000677.

<sup>320</sup> The result also holds for the two-entrant scenario: if I set the market share of the entrants to 7.5 percent each, then the but-for commission rate increases to 31.7 percent. See my workpapers. I am not asserting that Apple would charge a higher commission rate in the but-for world; I am instead showing how Professor Economides' method is unreliable and produces unrealistic results when using market shares based on the Epic Games Store's actual experience.

<sup>321</sup> Economides Report, ¶ 43.

<sup>322</sup> Economides Report, ¶ 43, ("I looked for platforms with the following characteristics: (1) the operating firm mainly collects revenue from the operation of a marketplace in the form of commissions and fees as opposed to from the selling of goods, digital or otherwise; (2) the operating firm has publicly reported and readily available financial statements; (3) the operating firm has available financial statements covering the period from 2015 onward, consistent with the class period in

provides no justification why hypothetical entrants that offer iOS app transactions would be expected to achieve similar profit margins as these five companies, nor does he show that existing actual app transaction platforms achieve similar profit margins to these companies. While Professor Economides relies on the analysis of developer Plaintiffs' accounting expert, Mr. Christian Tregillis, to determine the profit margins of these five companies, Mr. Tregillis said repeatedly in his deposition that he did not perform any analysis to determine whether the five benchmark companies were comparable to the App Store.<sup>323</sup> Since Professor Economides' model's predictions depend directly on assumptions regarding the relative profitability of the App Store and the assumed profit margins of the hypothetical entrants, his assumptions on profitability are also unreliable.

*6.2.1.7 Professor Economides' calculation of two tiers of commission rates is fundamentally flawed*

165. Beyond the methodological and factual errors described above, Professor Economides opines that the single "average commission rate" he calculates for PC app transaction platforms would then be divided into two tiers that would be experienced by all iOS app developers in the but-for world and thus common to the class.<sup>324</sup> Professor Elhauge reaches a similar conclusion, which I discuss in Section 6.3.<sup>325</sup> This opinion is internally inconsistent, entirely speculative, and demonstrably inconsistent with real world behavior (by Apple and by other app transaction platforms in Professor Economides' own benchmarks).

166. As discussed previously, while most app transaction platforms charge a headline commission rate of 30 percent, these platforms (as well as Apple) also charge a range of commissions to certain developers for certain transaction. Given this, the question becomes what would be the range of commission rates charged by iOS app transaction platforms (including the App Store) in the but-for world? To answer that question, one must determine:

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this case; and (4) revenues and margins from the operation of marketplaces are distinct from other operating segments of the firm."); and ¶ 44; Economides Report Backup, "Digital Research Commerce 360 Backup.xlsx."

<sup>323</sup> Deposition of Christian Tregillis, pp. 149:4–158:9. It is my understanding that Mr. Malackowski addresses the issues with Plaintiffs' experts' reliance on Mr. Tregillis' profitability analysis. Expert Report and Declaration of James E. Malackowski, August 10, 2021, ("Malackowski Report"), Section 11.

<sup>324</sup> Economides Report, ¶¶ 56–62.

<sup>325</sup> In his report, Professor Economides relies, at least in part, on Professor Elhauge's conclusion that Apple would have two tiers of commission rates in the but-for world. In his deposition, however, Professor Economides stated that while Professor Elhauge reached a similar conclusion, Professor Economides had also reached this conclusion independently. Economides Report, ¶57 ("As Prof. Elhauge has shown, it is likely that Apple would also charge a two-tiered price in the but-for world."); Economides Deposition, pp. 232:24–233:3 ("Q. Are you relying on Professor Elhauge for that opinion? A. Well, Professor Elhauge says the thing. But I also think, on my own, that this makes sense.").

- How many commission tiers would Apple, and other iOS app transaction platforms, have chosen in the but-for world?
- How would Apple, or other iOS app transaction platforms, have determined the level of the various tiers in the but-for world (and hence their differences)?
- Which developers' transactions would pay which commission rates?

167. Professor Economides' solution to these important unknown questions is to assume the answer. While he recognizes that he does not know how Apple (or others) would behave in the but-for world, he simply assumes that, since Apple currently has a 2:1 ratio (30 percent to 15 percent) between its two commission rates, this same ratio would apply to all transactions in the but-for world because "Apple's goals would be the same in the but-for world."<sup>326</sup> In other words, he assumes that all iOS app transactions would have faced a two-tier commission structure with the "high" rate and the "low" rate set such that it either keeps a ratio of 2:1 between the commission rates or that iOS app transaction platforms would keep the same ratio between the two rate tiers "after accounting for variable costs."<sup>327</sup> This approach assumes that:

- Apple and other app transaction platforms would only have two commission rates in the but-for world, ignoring that Apple already has at least three separate programs (all of which it could set different commission rates for in the but-for world), and that a number of other app transaction platforms have a range of rates and varied contract terms.<sup>328</sup>
- Apple and other app transaction platforms would either keep a 2:1 ratio between all commission rates, or they would keep the same ratio between commission rates "after accounting for variable costs."<sup>329</sup>
- 90 percent of app transactions would pay the higher rate, 10 percent the lower rate. Each developer would pay the lower rate if they paid the 15 percent commission rate in the real world. That is, he assumes that the lower rate of his two would apply to the same transactions that are charged 15 percent in the real world.<sup>330</sup>

168. This is not reliable analysis. First, the headline rate he has calculated already reflects by design the average of tiered rates by PC app transactions platforms as well as his measures of direct distribution. To create a uniform "tier" based off of that average for all but-for

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<sup>326</sup> Economides Report, ¶ 57.

<sup>327</sup> Economides Report, ¶ 60.

<sup>328</sup> Economides Report, ¶¶ 56–57. See also Section 5.5.

<sup>329</sup> Economides Report, ¶¶ 59–60.

<sup>330</sup> Economides Report, ¶ 58.

transactions makes no sense conceptually or economically because it presumes that (unlike the real world) all potential iOS app transaction platforms would select two commission rates rather than representing the full range of commission rates seen in the “yardsticks” and discussed in Section 5.5. Second, Professor Economides’ results regarding the form and value of the two tiers do not reflect commission rate structures observed in the real world (and indeed, in Professor Economides’ own suggested benchmarks). Rather, all of his methodologies simply calculate a single but-for commission, *then* utilize speculative assumptions to divide the commission rates into two tiers, and two tiers based only on the fact that Apple currently charges two different commission rates in the actual world.

169. Additionally, Professor Economides’ assumed two-tier structure does not reflect economic fundamentals or existing app transaction platform practices. For example, Apple currently has multiple programs for which it has chosen to charge a lower commission rate, and it could choose to set different commission rates (or not) for each of these programs in the but-for world. Professor Economides relies on the fact that Apple *currently* sets the commission rate of these three different programs at 15 percent (half of its 30 percent headline commission rate) to reach his conclusion.<sup>331</sup> The fact that Apple charges a 15 percent commission rate for all three programs in the actual world is an outcome based on the current structure of the App Store and the fact that all developers must offer their iOS apps through the App Store. There is no economic reason to think that Apple would set the commission rates for these programs based on a fixed proportion of its headline commission rate in a but-for world in which there are other iOS app transaction platforms. Nor is there any reason to think that other iOS app transaction platforms would choose to use the exact same structure. He does not provide any justification for assuming a two-tier commission rate structure for direct distribution. In general, Professor Economides presents no evidence at all to support his assumed two-tier but-for commission rate structure.<sup>332</sup>

170. As I discussed in Section 6.2.1.4, Professor Economides’ own yardsticks based on PC app distribution platforms set a variety of commission rates. Thus, the commission rates charged by his yardstick platforms do not follow this “ratio” approach. This means that Professor Economides’ opinion on what serves as a proper benchmark when using his PC market “yardstick” falsifies his *own* assumptions regarding two tier commission rates in the but-for world. As a simple example, Steam currently has three commission rates based on the

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<sup>331</sup> These programs are the Video Partner Program, the rate on subscriptions after one year, and the Small Business Program.

<sup>332</sup> At his deposition, Professor Economides incorrectly asserted that Apple has two commission rate tiers throughout the developer class period. Economides Deposition, p. 233:10–14 (“Q. For how long has Apple had two tiers? ... [I]t definitely had two tiers throughout [the] class period.”). As I discussed previously, Apple first set a reduced commission rate in 2016. See Figure 19.

lifetime earnings of each app: 30 percent, 25 percent, and 20 percent.<sup>333</sup> Because Professor Economides' approach is algebraic and assumption-based, it cannot incorporate three commission rate tiers like Steam has – he simply assumes that possibility away. Professor Economides' approach is so unrealistic that it generates but-for commission rates where, across every single one of his scenarios, the **highest** but-for commission rate he believes Apple would charge (15.6 percent) is lower than the **lowest** commission rate currently charged by Steam in the actual world (20 percent).

171. Finally, Professor Economides also considers an assumption that aims to adjust the ratio “after accounting for variable costs.” This approach follows the exact same formulas as the 2:1 ratio, except it attempts to subtract a measure of cost from the equation. This arbitrary adjustment has little impact in his calculations and ultimately suffers from the same flaws described above, as well as additional flaws described in detail in Section 9.

#### *6.2.2. Flaws in Professor McFadden's but-for commission rates*

172. Professor McFadden's but-for commission rate is not based on economics or any analysis in general. Instead, he simply cherry-picks commission rates from certain PC app transaction platforms, leading him to assume but-for commission rates that are much lower than those charged by most app transaction platforms.

173. Professor McFadden presents no analysis to determine his but-for commission rate. Instead, he simply asserts that “markets that have similar characteristics but are more competitive can provide useful benchmarks.”<sup>334</sup> He then states that “[w]hat has happened to games app stores on the PC platform in the last few years is particularly relevant” because “[i]ndustry experts explain that the PC game app stores operate the same way as the App Store.”<sup>335</sup> For this point, he cites Dr. Evans' opening report in *Epic v. Apple*.<sup>336</sup> He provides no actual analysis to show that PC game app transaction platforms “operate the same way as the App Store.” He provides no analysis or even discussion of app transaction platforms for other devices and why those platforms are not also relevant benchmarks. For example, he provides no discussion of commissions charged by Android app transaction platforms, even though these platforms provide transactions for other mobile devices and there are multiple app transaction platforms for Android devices. He also does not discuss PC transaction platforms for non-game apps even though the market he has defined includes transactions for all types of iOS apps, including non-game apps. In sum, Professor McFadden's decision to

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<sup>333</sup> See Section 5.5.2.1.

<sup>334</sup> McFadden Report, ¶ 155.

<sup>335</sup> McFadden Report, ¶ 156.

<sup>336</sup> McFadden Report, footnote 220.

focus exclusively on a subset of PC game transaction platform commission rates is completely arbitrary and unjustified.

174. After concluding that PC game app transaction platforms are “particularly relevant,” Professor McFadden then provides a limited history of commission rates charged on some PC game transaction platforms in the “last few years.” In particular, he mentions:

- The entry of the Epic Games Store in December 2018, which set a headline commission rate of 12 percent.
- Steam’s decision in November 2018 (which Professor McFadden asserts was likely in response to the entry of the Epic Games Store) to reduce the commission rate for the largest developers to 20 or 25 percent.
- Microsoft’s decision in April 2021 to lower the commission rate for games on the Microsoft Store for PCs to 12 percent beginning on August 1, 2021.<sup>337</sup>
- The entry of the Discord Store around October 2018 and its decision in December 2018 to charge a headline commission rate of 10 percent starting in 2019.<sup>338</sup>

175. After laying out these facts, Professor McFadden asserts that the but-for commission rate for all iOS app transactions absent the challenged conduct would have been a uniform 10 to 12 percent for the entire class period.<sup>339</sup> Professor McFadden does not even provide a justification for how he arrived at the but-for commission rate of 10 to 12 percent given his earlier discussion. It appears that he chose these rates based on the commission rates charged by the Epic Games Store and Discord as well as the commission rate the Microsoft Store for PC games had announced that it would charge in the future (but had not yet implemented at the time Professor McFadden filed his report).<sup>340</sup> Assuming this is the rationale for his but-for commission rates, Professor McFadden’s but-for commission rate it is completely arbitrary and is based on cherry-picked commission rates charged by inappropriate benchmark platforms.

176. First, despite discussing the commission rates offered on Steam, the largest transaction platform for PC games, Professor McFadden ignores them entirely to determine his but-for commission rate of 10 to 12 percent. He provides no justification for why the commission rates on Steam are not relevant benchmarks for the but-for commission rate, and instead appears to base his but-for commission rates solely on the Epic Games Store, the Microsoft

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<sup>337</sup> McFadden Report, ¶ 158.

<sup>338</sup> McFadden Report, ¶¶ 156, 158–159.

<sup>339</sup> McFadden Report, ¶ 161.

<sup>340</sup> McFadden Report, ¶¶ 158–161.



Store, and the Discord Store. However, the Epic Games Store and the Microsoft Store are much smaller than Steam: collectively these two platforms were only 33.6 percent as large as Steam in 2019 based on Professor Economides' analysis.<sup>341</sup> The decision to ignore Steam's commission rates results in Professor McFadden assuming an artificially low but-for commission rate—the commission rates charged on Steam today are nearly two (for the largest developers) to three (for most developers) times Professor McFadden's but-for commission rate of 10 percent.

177. Second, the Epic Games Store does not provide a valid benchmark for the commission rate that Apple, or other iOS app transaction platforms, would charge in the but-for world. As discussed previously, the Epic Games Store is the exception to the 30 percent commission rate standard charged by most relevant app transaction platforms.<sup>342</sup> Moreover, the Epic Games Store is not currently profitable and is not forecasted to be profitable for at least a few years.<sup>343</sup> Assuming that the App Store or other iOS transaction platforms would charge a commission rate that is not profitable when enacted by the Epic Games Store is nonsensical.

178. Third, the Discord Store does not provide a valid benchmark for the commission rate that Apple or other iOS app transaction platforms would charge in the but-for world. First, the Discord games store launched a publicly-available beta version with just 22 titles in October 2018.<sup>344</sup> Two months later, Discord announced it would introduce the 10 percent commission rate cited by Professor McFadden, starting in 2019.<sup>345</sup> However, just three months after that, in March 2019, Discord abandoned the store entirely and removed the "Store" tab from its social platform (although developers were still technically able to keep selling their games through the developer's own Discord server or through pre-existing

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<sup>341</sup> See my workpapers. As discussed in ¶178, the Discord games store only operated for six months from October 2018 to March 2019. While Professor McFadden considers Discord in his analysis, I have excluded it from this calculation due to its short-lived nature. Additionally, I use Steam revenue presented in Table 4 of Professor Economides' report, which is based on estimates in an internal Microsoft presentation. If I instead use Valve's own estimate of Steam's 2019 revenue and Epic's own estimate of Epic Games Store's 2019 revenue, I find that the Epic Games Store and Microsoft Store were collectively 29.4 percent as large as Steam in 2019. See Microsoft Profit Presentation; Epic Games Store, "Epic Games Store Weekly Free Games in 2020!," January 14, 2020, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-weekly-free-games-in-2020>; Valve Document, "Net Steam Sales, Partner Revenue Share Payments and Net to Valve: CY2015 to CY2020," undated, VALVE\_000677.

<sup>342</sup> Hitt *Epic Report*, ¶ 336.

<sup>343</sup> Reporter's Transcript of Proceedings, *Epic Games Inc. v. Apple, Inc.*, May 3, 2021, p. 26.

<sup>344</sup> Nick Statt, "Discord's game store launches globally today with indie gems like Howlow Knight and Dead Cells," *The Verge*, October 16, 2018, available at <https://www.theverge.com/2018/10/16/17980810/discord-digital-game-distribution-store-steam-competitor-nitro-subscription-service>, accessed on August 9, 2021.

<sup>345</sup> Nelly, "Why not 90/10?," Discord Blog, December 14, 2018, available at <https://blog.discord.com/why-not-90-10-3761ebef4eab>, accessed on August 10, 2021.



Discord Store links).<sup>346</sup> Discord instead pivoted to focusing on including games in its subscription service, Discord Nitro, which at the time cost \$49.99/year or \$4.99/month. Finally, in September 2019, this concept was also abandoned because “the vast majority of Nitro subscribers didn’t play [the games].”<sup>347</sup>

179. It is my understanding that a small number of games remain for sale through Discord, either through links to the defunct Discord Store or by purchasing through developers’ own Discord servers. However, the Discord Store’s developer portal suggests that game approval submissions have been on pause for at least one year, so it is my understanding that new games can no longer be sold on Discord.<sup>348</sup> If anything, the experience of the Discord game store serves as an illustration of why Professor McFadden’s thinly supported and assumption-based approach to but-for commission rates is ill-advised. The Discord Store was short-lived, had varying commission rates *and* business models over time (with Professor McFadden’s benchmark rate of 10 percent only being prevalent and fully active for three months), and ultimately failed within a year.

180. Fourth, the Microsoft Store only reduced its headline commission rate for PC game transactions on August 1, 2021. In fact, at the time that Professor McFadden filed his report, the Microsoft Store still charged a 30 percent commission rate for all PC game transactions. Professor McFadden provides no justification for assuming that the Microsoft Store’s commission rate after August 1, 2021 is an appropriate benchmark for iOS app transactions through history, while ignoring that the Microsoft Store has charged a 30 percent headline commission rate for game transactions prior to August 1, 2021 and has charged a 30 percent headline commission rate for non-game transactions prior to October 26, 2017. Professor McFadden also chooses to ignore the significant variation in terms present on the Microsoft Store, as I discussed thoroughly in Section 5.5.2.4.

181. Fifth, all of Professor McFadden’s but-for commission rates are based on commission rates from December 2018 or later. Professor McFadden has not considered any commission rates that were in place on other app transaction platforms for the majority of the class

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<sup>346</sup> James Batchelor, “Discord Game Store refocuses on Nitro subscription, devs can now sell games directly,” *gamesindustry.biz*, March 14, 2019, available at <https://www.gamesindustry.biz/articles/2019-03-14-discord-game-store-refocuses-on-nitro-subscription-as-servers-allow-devs-to-sell-games-directly>, accessed on July 28, 2021.

<sup>347</sup> Chris Welch, “Discord gives up on subscription games because no one was playing them,” *The Verge*, September 13, 2019, available at <https://www.theverge.com/2019/9/13/20864278/discord-nitro-games-subscription-bundle-discontinued>, accessed on July 28, 2021. At the time the subscription service was shut down, Discord Nitro had a total of 97 games. See Delisted Games, “Discord Nitro Games,” October 16, 2019, available at <https://delistedgames.com/discord-nitro-games/>, accessed on August 9, 2021.

<sup>348</sup> Discord, “Approval for Commerce Currently on Pause,” available at <https://support-dev.discord.com/hc/en-us/articles/360041437171>, accessed on August 9, 2021.

period. Assuming that only commission rates charged by PC app transaction platforms after December 2018 are appropriate benchmarks would only make sense if PC app transaction platforms were prevented from competing prior to December 2018, which Professor McFadden does not claim, and is not consistent with the existence of multiple PC app transaction platforms, such as Steam, the Microsoft Store, GOG.com, and large game developers operating storefronts for direct distribution, such as Origin and Battle.net prior to December 2018.<sup>349</sup>

182. Lastly, Professor McFadden chooses to apply an average but-for commission rate rather than to acknowledge and reflect the real world reality of the range of commission rates offered by app transaction platforms.

183. In sum, Professor McFadden's assumed but-for commission rate is not based on economics or any actual analysis. His but-for commission rate misrepresents and is in direct contradiction with the level and breadth of commission rates charged by PC app transaction platforms in the real world, and in fact his assumption that the App Store would charge only one commission rate is in direct contradiction with Professor Economides and Professor Elhauge's opinion that the App Store would have a two-tier commission rate structure.<sup>350</sup> He also ignores the fact that prior to the end of 2018, even focusing only on the platforms he considers, none charged anything other than a 30 percent headline rate. Overall, Professor McFadden's but-for commission rate is unreliable for determining impact or damages for proposed consumer class members.

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184. Overall, Professor Economides and Professor McFadden's analyses do not support their conclusions that, absent Apple's challenged policies, all iOS app transaction platforms would have charged all developers average commission rates of 10 to 14.8 percent. Rather, their conclusions directly contradict reality. Observed evidence from competing app transaction platforms contradicts Plaintiffs' conclusion as there is no app transaction platform in which the existence of competing third-party or direct distribution app platforms in the same device has led to a uniform 10 to 14.8 percent commission rate, nor have there been any PC app transaction platforms offering uniform reductions in commission rates below 30 percent prior to 2018. There is in fact no device today for which all app transaction platforms for the

<sup>349</sup> See Section 5.5.2 and Section 5.6.

<sup>350</sup> McFadden Deposition, 156:8–157:12 (“Q. Professor, in your but-for world, do you assume that there will be a single uniform commission rate? A. Yes, the but-for calculation that I do uses one of these rates here, hovering in the 10 to 12 percent range or the two extremes, and seems that's uniform. Q. Is there some reason why you would reject the possibility that there would, in the but-for world, be a tiered commission structure? A. I would not reject that possibility. I believe that, under competition, competition would tend to erode a tier structure – well, leave it at that time.”).

device charge Plaintiffs’ assumed commission rate of 10 to 14.8 percent—instead, there are different app transaction platforms with different commission rates, the predominant headline rate being 30 percent. Thus, Plaintiffs have offered no reliable evidence that Apple (or any third-party transaction platform) would have lowered its average commission rate to 10 to 14.8 percent for all apps in the but-for world for the entire relevant class period.<sup>351</sup> Instead, they have largely assumed their conclusion of common impact.

***6.3. Professor Elhauge’s claim that Apple would reduce all commission rates in the but-for world is speculative and is contradicted by the actual commission rates charged on the comparable platforms he considers to be relatively unconstrained by anticompetitive conduct***

185. As previously noted, Professor Elhauge does not attempt to determine but-for commission rates. Instead, he relies on the conceptual argument that “[i]n the but-for world, Apple would likely adjust its entire commission schedule downward, which would necessarily reduce all class members’ commissions.”<sup>352</sup> Professor Elhauge’s claim is directly contradicted by market facts that show that in marketplaces he considers “relatively unconstrained by anticompetitive conduct,”<sup>353</sup> in addition to others, a 30 percent headline commission rate—as is used by Apple—is prevalent.

186. In Section 5.5.2, I outlined relevant market facts regarding commission rates on Windows (PC) app transaction platforms as well as on macOS app transaction platforms. These are platforms that operate in “markets” that Professor Elhauge opines are “relatively unconstrained by anticompetitive conduct” and are “most similar to the iOS app distribution market.”<sup>354</sup> There I showed that during the class period, on platforms like the Mac App Store (Section 5.5.2.2), Steam (Section 5.5.2.1), and the Microsoft Store (Section 5.5.2.4) a 30 percent headline commission rate has been prevalent.<sup>355</sup> In making his comparisons to platforms in these “markets,” Professor Elhauge focusses on the *minimum* commission percentages offered among the various commission rates.<sup>356</sup> He does not note the prevalence of a 30 percent headline commission rate throughout the class period.

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<sup>351</sup> As discussed in Section 6.2.1.7, Professor Economides does calculate two tiers of commission rates, but the calculations are entirely pretextual: his approach is derived entirely from a single average but-for commission rate and does not distinguish between developers.

<sup>352</sup> Elhauge Report, ¶ 340.

<sup>353</sup> Elhauge Report, ¶ 334.

<sup>354</sup> Elhauge Report, ¶ 334.

<sup>355</sup> See also Figure 19, Figure 20, and Figure 21.

<sup>356</sup> Elhauge Report, ¶ 335.

187. In addition, other app transaction platforms that Professor Elhauge dismisses as not relevant competitive benchmarks, such as Android app transaction platforms like Google Play, the Amazon Appstore, and the Samsung Galaxy Store, also had 30 percent headline commission rates during the class period.<sup>357</sup> In Section 6.2.1.3, I discussed why Professor Economides and Professor Elhauge's arguments for ignoring the commission rates charged by Android app transaction platforms are not valid. Finally, app transaction platforms for consoles also had 30 percent headline commission rates during the class period. Though Professor Elhauge does not appear to specifically consider the console app transaction platforms as a relevant benchmark for but-for iOS app transaction platforms, he does claim that "video game console manufacturers have not foreclosed all rival distribution of apps for their video game consoles."<sup>358</sup>

188. Contradicting these market facts regarding competitive outcomes in comparable marketplaces, Professor Elhauge claims that in the but-for world, Apple would maintain its two-tier commission structure and move its whole commission rate structure down due to competitive pressure, thus implying a headline commission rate lower than 30 percent.<sup>359</sup> Professor Elhauge claims that Apple's use of a two-tier commission schedule in the actual world implies that it would maintain this structure in the but-for world, only at a lower level.<sup>360</sup> However, contrary to Professor Elhauge's claim, Apple has not maintained a rigid commission schedule in the actual world. As outlined in Section 5.2.3, Apple has introduced changes to its commission rate schedule over time, such as introducing a 15 percent commission rate for subscription renewals, then for transactions that qualify under the Video Partner Program, and then for transactions under the Small Business Program.<sup>361</sup> Each change lowered the commission rate on certain transactions and thus lowered Apple's overall effective commission rate. It is thus speculative for Professor Elhauge to claim that Apple's only response to purported increased competition would be to lower its entire commission schedule, abandoning the pervasive and common 30 percent headline rate. As it has done so in the past, Apple could choose to change what types of transactions qualify for the lower 15

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<sup>357</sup> Elhauge Report, Appendix A. See also Figure 19, Figure 20, Figure 21, and Section 5.5.1.

<sup>358</sup> Elhauge Report, ¶ 409.

<sup>359</sup> Elhauge Report, ¶ 348.

<sup>360</sup> Elhauge Report, ¶ 351. When Professor Elhauge does consider the possibility that the entire commission rate structure might not be lower, he only considers, without any basis, the alternative that the 30 percent headline commission rate would fall. Elhauge Report, ¶ 350. He does not consider other possible changes, like the lower tier commission rate (i.e., the 15 percent commission rate) falling or the further designation of particular transaction types qualifying for the lower tier commission rates. Both of these alternatives would imply a lower effective commission rate.

<sup>361</sup> Professor Elhauge discusses each of these changes in his report. Elhauge Report, ¶¶ 357–363.

percent commission tier. This would also imply that any necessary investment incentives that the two-tier commission rate structure enables would be maintained.<sup>362</sup>

189. Alleged increased but-for competition could also have led Apple to offer a new price tier below its 30 percent headline rate, as it did when it initially offered the 15 percent tier.<sup>363</sup> As outlined in Section 5.5, comparable app transaction platforms have also offered different pricing tiers through time while maintaining a 30 percent headline commission rate. As I have discussed, Professor Elhauge claims that in a competitive app transaction marketplace different iOS app transaction platforms would offer varying commission rates due to their differentiated products and different business strategies.<sup>364</sup> Analysis of different app transaction platforms demonstrates this empirically.<sup>365</sup>

190. Professor Elhauge is also incorrect when he claims that “[i]n the but-for world, Apple would face increased competition for *every* developer.”<sup>366</sup> As a theoretical matter it may be the case that “every developer would have the option of self-distributing their apps, and every developer would have the option of using a rival iOS app distributor.”<sup>367</sup> However, practically, every developer does not have the option of direct distribution. While I disagree with his assumption, Professor Economides assumes fixed costs of [REDACTED] for direct distribution. For a small developer (of which there are many, as I show in Figure 7 and Figure 10), this would not be a viable option.<sup>368</sup> Similarly, the differentiated nature of different app transaction platforms implies that in practice rival iOS app transaction platforms may not be viable options for all developers.

191. Finally, the Mac App Store already faces competition from “every developer” as well as a number of large, established third-party distribution platforms, yet still continues to charge a 30 percent commission rate. Indeed, as I discuss in the next section, contrary to Professor Elhauge, market facts show that it is likely that Apple would adopt the same but-for commission rates that it has charged in the actual world.

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<sup>362</sup> Professor Elhauge states that “in the actual world, the difference between the high commission tier (30%) and the low commission tier (15%) incentivized developers to make the investments that can qualify some their [sic] transactions for the low commission tier, such as retaining subscriber [sic] for over a year and integrating their apps into Apple TV.” Elhauge Report, ¶ 379.

<sup>363</sup> See Section 5.2.3.

<sup>364</sup> Elhauge Report, ¶ 325.

<sup>365</sup> See Section 5.5.

<sup>366</sup> Elhauge Report, ¶ 346. (emphasis in original)

<sup>367</sup> Elhauge Report, ¶ 346.

<sup>368</sup> I discuss this further in Section 8.1.2 below.

192. Overall, market facts do not support Professor Elhauge's argument that, absent Apple's challenged conduct, Apple, and all other iOS app transaction platforms, would have charged all developers a commission rate below Apple's actual rate.<sup>369</sup> Thus, with respect to commission rates alone, he has not established any common impact.<sup>370</sup> Rather, market facts show that the predominant headline commission rate would be 30 percent. Professor Elhauge has provided no methodology, common or otherwise, to establish which developers would have paid this 30 percent rate (thus faced no impact from any alleged inflated commission rate), and which would not.<sup>371</sup>

***6.4. The App Store's but-for commission rate would likely be the same as the App Store's actual commission rate***

193. Plaintiffs' experts assume that in the but-for world, Apple would reduce the commission rates on the App Store. In reality, the most likely outcome based on historical observation of Apple and other platforms is that the App Store would charge the same commission rates in the but-for world as it has charged in the actual world.

194. As I have discussed, Plaintiffs' experts' assumptions that Apple would charge a lower commission rate in the but-for world are inconsistent with market realities. While some app transaction platforms charge lower headline commission rates or have recently reduced their commission rates for certain apps, the predominant headline commission rate charged by app transaction platforms during the class period is 30 percent.<sup>372</sup> Apple charges a 30 percent commission rate for app transactions through the Mac App Store, and Google, Samsung, and Amazon charge similar rates to Apple for the distribution of Android Apps.<sup>373</sup> Neither PC nor Android app transaction platforms are subject to the allegedly anticompetitive acts at issue in this case.

195. Professor Economides, Professor Elhauge, and Professor McFadden recognize in their own analyses that commission rates vary across app transaction platforms and that many app transaction platforms charge 30 percent. For example, evidence from Professor Economides' commission rate yardstick model shows that different PC app transaction platforms charge

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<sup>369</sup> Elhauge Report, ¶ 349 and footnote 528.

<sup>370</sup> I discuss in Section 8 that a proper assessment of impact requires more than just an assessment of but-for commission rates.

<sup>371</sup> In his deposition, Professor Elhauge testified that if, in the but-for world Apple, continued to charge a 30 percent headline commission rate, he has not proposed a methodology that can establish whether a given developer was injured. Elhauge Deposition, pp. 195:12–196:10. Similarly, he testified that if in the but-for world, Apple adopted Steam's commission rate tiers, then his "particular methodology would no longer apply." Elhauge Deposition, pp. 198:23–199:7.

<sup>372</sup> See Section 5.5.

<sup>373</sup> See Section 5.5.



different commission rates.<sup>374</sup> Some of the app transaction platforms he analyzes, such as Steam, have historically charged a 30 percent commission rate and continues to charge a 30 percent commission rate for nearly all developers that transact on the platform.<sup>375</sup> Professor McFadden also discusses both Steam's 30 percent commission rate as well as the fact that the Microsoft Store charged a headline 30 percent commission rate until August 1, 2021.<sup>376</sup>

196. Given these market realities, Plaintiffs' experts provide no explanation for why Apple would not charge the same commission rates in the but-for world that it has charged in the actual world, even if other iOS app transaction platforms enter and may charge lower rates.

197. In reality, it is likely that Apple would adopt the same commission rates in the but-for world that it has charged in the actual world. While this may result in some lost business if developers were to start transacting on alternative iOS app transaction platforms that charge lower commission rates or by distributing directly to consumers, there are multiple reasons that Apple would be able to sustain these commission rates even with entry of other iOS app transaction platforms in the but-for world. As Professor Schmalensee discusses, the App Store benefits from significant indirect network effects.<sup>377</sup> Thus, the large number of developers that transact through the App Store attract a large number of consumers to transact through the App Store, and vice versa. The App Store would continue to feature significant indirect network effects in the but-for world, making it an attractive option for developers and consumers. Moreover, the App Store is a high-quality, differentiated product that provides valuable services and features to developers and consumers.<sup>378</sup> This would make the App Store attractive for developers and consumers in the but-for world, allowing it to sustain its headline 30 percent commission rate even if other iOS app transaction platforms charged lower commission rates.<sup>379</sup>

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<sup>374</sup> Economides Report, Table 4.

<sup>375</sup> See Section 5.5.2.1.

<sup>376</sup> McFadden Report, ¶ 157 ("Previously, Steam had charged a constant 30 percent commission rate on game revenues. Under Steam's new commission structure, the commission rate paid to Steam would fall to 25 percent on a game's sales above \$10 million, and decrease again to 20 percent on sales above \$50 million."); McFadden Report, ¶ 158 ("On April 29, 2021, Microsoft announced that it would reduce the commission charged on its Microsoft Store for PCs from 30 percent to 12 percent for game developers beginning August 1st, 2021.").

<sup>377</sup> Schmalensee Report, Section VII.C. Professor Elhauge agrees that indirect network effects are important and would disadvantage new app distributors. Elhauge Report, ¶301.

<sup>378</sup> I discuss how the App Store is differentiated in more detail in Section 8.1.1.

<sup>379</sup> I discuss results of the surveys conducted by Professor Simonson showing that many consumers would still transact on the App Store if other iOS app transaction platforms were available in Section 8.1.5.



***6.5. A but-for commission rate based on the commission rates observed on app transaction platforms in the actual world would result in many developers and consumers in the proposed classes being unharmed***

198. Professors Economides, Professor Elhauge, and Professor McFadden's conclusions on common impact all flow from their assumed lower-than-observed-in-the-real-world but-for average commission rate(s). As I have shown, given the many app transaction platforms operating today in a variety of contexts in the absence of the challenged conduct, the most likely but-for headline commission rate that Apple and possibly other potential iOS app transaction platforms would have charged is the 30 percent commission rate that has been the predominant headline commission rate charged by app transaction platforms in the real world. I now show that applying real-world evidence to inform the but-for commission rates charged by Apple and potential iOS app transaction platforms results in many developers and consumers in the proposed classes being unharmed.

***6.5.1. Android app transaction platforms show that it is likely that in the but-for world many developers and consumers in the proposed classes would be unharmed***

199. Commission rates charged by Android app transaction platforms show that it is likely that but-for commission rates on the App Store would result in many unharmed proposed developer and consumer class members. As previously discussed, Android app transaction platforms do not employ the practices that are challenged in this litigation.<sup>380</sup> Namely, there are multiple Android app transaction platforms that compete with Google Play, developers and consumers can and do use alternative platforms as well as direct distribution, and there is no restriction by Google Play on app pricing increments.<sup>381</sup> The commission rates on Android app transaction platforms therefore provide information about what the commission rate would be for iOS app transaction platforms in the but-for world in which Apple did not engage in the challenged conduct.

200. As discussed earlier, Google Play has charged a headline commission rate of 30 percent since its inception. Google Play has also followed the App Store by lowering commission rates over time for select types of transactions, notably for subscription renewals after the first year and for small app developers in 2021.<sup>382</sup> In other words, the commission rates

<sup>380</sup> See ¶¶ 139–144.

<sup>381</sup> See Section 5.5.1 and Section 5.6; Google Play Developer Distribution Agreement, November 17, 2020, GOOG-APPL-00099190 at GOOG-APPL-00099192 ("3.3 Products are displayed to users at prices You establish in Your sole discretion.").

<sup>382</sup> As discussed in 5.5.1.1, internal Google documents show that approximately [REDACTED] developers that transact through Google Play participate in commercial programs that receive [REDACTED]

charged by Google Play in the actual world are essentially the same as the commission rates charged by the App Store.<sup>383</sup> This provides strong evidence that in a possible but-for world in the absence of the alleged conduct Apple's *but-for commission rates would likely be the same as the commission rates that the App Store has charged in the actual world for nearly all developers*.

201. It follows that any developer that would *only* transact with consumers through the App Store in the but-for world would pay the same commission rate that it pays in the actual world. These developers thus would not be harmed and would have suffered no damages. These developers are also unlikely to lower consumer prices in the but-for world since they pay the same commission rate as in the actual world.<sup>384</sup> Thus, any consumer that would *only* transact on the App Store in the but-for world would not be harmed by Apple's challenged conduct and would have suffered no damages.

202. Not only does the largest Android app transaction platform, Google Play, generally charge a 30 percent commission rate, but, as discussed earlier, two other Android app transaction platforms, the Amazon Appstore and the Samsung Galaxy Store, both also charge a headline 30 percent commission rate.<sup>385</sup> [REDACTED], as I showed above, at least in the case of the Amazon Appstore, the overwhelming majority of developers—98.5 percent—pay a 30 percent commission rate.<sup>386</sup>

203. Thus, the Android environment supports the conclusion that but-for commission rates on alternative large iOS app transaction platforms would be the same as the commission rates Apple actually charges, even for developers and consumers that might have chosen to

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[REDACTED]. The presentation does not allow me to determine how many developers that transact through the App Store would qualify for one of these commercial programs and may pay a lower commission rate in the but-for world if the commission rates on the App Store were the same as those on Google Play. However, even assuming that [REDACTED] developers would receive a lower commission rate through a commercial program in the but-for world, that would represent just [REDACTED] of the 67,938 developers in the proposed developer class. In addition, determining which developers would qualify for such commercial programs would require individualized inquiry.

<sup>383</sup> Commission rates could also vary between Google Play and the App Store due to differences in timing of when the two platforms implemented changes to commission rates. For example, Apple implemented a 15 percent commission rate for subscription renewals in September 2016 while Google implemented such a commission rate in January 2018. Apple implemented its 15 percent commission rate for small developers on January 1, 2021 while Google implemented its 15 percent commission rate for small developers on July 1, 2021. See Figure 19. Google's small business program also differs from Apple's in its implementation, so determining which developers would pay less in commissions on net given these differences would require individualized inquiry.

<sup>384</sup> Plaintiffs' experts have provided no reason that consumer prices would be lower in the but-for world if a developer pays the same commission rate in both the but-for world and actual world.

<sup>385</sup> See Section 5.5.1.

<sup>386</sup> See Section 5.5.1.3.

transact at least in part on these alternative iOS app transaction platforms. While some developers may be able to individually negotiate a lower commission rate on an alternative iOS transaction platform, [REDACTED], determining which developers would be able to do so, and which consumers would transact with those developers, would require individualized inquiry.<sup>387</sup> Similarly, while there may be other, smaller iOS app transaction platforms that charge less than 30 percent (as certain Android app transaction platforms do, such as Aptoid), individual inquiry would be required to determine which developers and consumers would transact on such platforms, if any existed, in the but-for world. I discuss the need for individualized inquiry to determine where developers and consumers would transact in the but-for world in Section 8.1.

204. In other words, unless a developer obtains an individually negotiated discount or transacts through a much smaller iOS app transaction platform, developers who would choose to transact on a large alternative iOS app store in the but-for world would still be likely to pay a 30 percent commission and therefore would have suffered no harm as a result of Apple's challenged conduct. Similarly, consumers that transact with these developers on these alternative iOS app transaction platforms would not be expected to be harmed. Alternatively, determining which developers (and consumers) would transact at a lower commission, either because of a negotiated discount or because of their decision to transact on a smaller transaction platform with a lower commission rate would be a matter of individual inquiry.

205. Finally, some developers directly distribute Android apps to consumers and developers and consumers may also utilize direct distribution in an iOS but-for world. However, identifying such developers requires an evaluation of how both developers and consumers would choose between alternative app sources (including third-party iOS app transaction platforms and direct distribution) which is highly individualized for both developers and consumers (and not described or analyzed in any way by Plaintiffs). Determining the fact and amount of harm for these developers and consumers depends on the cost structure for developers and how developers choose (or choose not to) pass through any savings to consumers in the form of lower prices. I discuss the need for individualized inquiry to determine which developers would distribute directly and which consumers would choose to obtain apps directly from developers in the but-for world in Section 8.1.3.

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<sup>387</sup> See Sections 5.5.1.2 and 5.5.1.3.

*6.5.2. The Mac App Store provides evidence that in the but-for world many developers and consumers in the proposed classes would be unharmed*

206. Commission rates charged by the Mac App Store show that it is likely that but-for commission rates on the App Store would result in many unharmed proposed developer and consumer class members.

207. As discussed above, the Mac App Store charges a 30 percent headline commission rate as well as a 15 percent commission rate for certain app transactions, equal to the commission rates on the App Store.<sup>388</sup> Professor Economides claims that the Mac App Store is subject to competition from other Mac app transaction platforms and that Apple does not use the challenged conduct in macOS app distribution.<sup>389</sup> Thus, the Mac App Store's commission rates imply that the commission rates set by the App Store in the but-for world would remain the same as in the actual world because Apple has already chosen to set those rates in a market that Professor Economides considers an appropriate benchmark.<sup>390</sup>

208. Furthermore, developers and consumers regularly choose to transact on the Mac App Store. In 2020 alone, there were [REDACTED] app downloads and [REDACTED] in-app purchases through the Mac App Store, from which developers earned [REDACTED] of revenue.<sup>391</sup> In fact, many developers choose to transact only on the Mac App Store: a 2019 survey found that [REDACTED] of Mac developers transact their apps exclusively through the Mac App Store.<sup>392</sup>

209. Thus, if in the but-for world the commission rates on the (iOS) App Store were the same as the commission rates on the Mac App Store, and 21 percent of proposed developer class members still choose to transact through the App Store, these developers would be unharmed. In addition, the proposed consumer class members that transact entirely with these developers would also be unharmed.

*6.5.3. Using but-for commission rates based on the full range of PC app transaction platforms' commissions results in many developers and consumers in the proposed classes being unharmed*

210. Considering the range of commission rates charged by PC app transaction platforms, which Professor Economides, Professor Elhauge, and Professor McFadden claim are

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<sup>388</sup> See Section 5.5.2.3.

<sup>389</sup> See Section 6.2.1.3.

<sup>390</sup> See Section 6.2.1.3.

<sup>391</sup> See my workpapers.

<sup>392</sup> Setapp, "Annual Mac Developer Survey," 2019, p. 5, available at <https://cdn.setapp.com/blog/images/Annual-Setapp-Mac-Market-Survey-2019.pdf>, accessed on August 7, 2021.

competitive, shows that there would likely be many unharmed proposed class members in the but-for world.

*6.5.3.1 Using but-for commission rates that are equal to the headline commission rates charged by PC app transaction platforms throughout the class period results in no impact or damages for many proposed developer and consumer class members*

211. Applying but-for commission rates equal to the headline commission rates for the top PC app transaction platforms analyzed by Professor Economides throughout the relevant class period would result in no impact or damages for many proposed developer and consumer class members. For example, at headline PC app transaction platform commission rates in the but-for world, any proposed developer class member that had no non-game transactions after October 25, 2017 and no game app transactions after November 30, 2018 would be unharmed.<sup>393</sup> Exceptions to this could only be identified through individual inquiry, by determining the subset of developers, if any, that would have obtained individualized rates or would have been able to distribute directly to consumers.

212. As shown in Section 5.5.2.4, the Microsoft Store lowered its commission rate from 30 percent to 15 percent for non-game app developers on October 26, 2017 while Steam lowered its commission rate for the largest developers on November 30, 2018. In addition, the Epic Games Store did not enter and start charging a 12 percent commission until December 2018. Thus, prior to Steam's decision to lower commission rates for the largest game developers, all of the PC app transaction platforms analyzed by Professor Economides and in existence before November 2018 charged a headline 30 percent commission rate for game app transactions. Similarly, all PC app transaction platforms analyzed by Professor Economides and in existence before October 2017 charged a headline 30 percent commission rate for non-game app transactions. In other words, for nearly half of the developer class period, and a large majority of the consumer class period, the commission rate on PC app transaction platforms was 30 percent. By Plaintiffs' logic, it follows that the headline but-for commission rate charged by Apple and other iOS app transaction platforms would be 30 percent for game apps prior to November 2018 and for non-game apps prior to October 2017.<sup>394</sup>

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<sup>393</sup> This does not imply that proposed developer or consumer class members that transacted on the App Store after November 2018 are harmed.

<sup>394</sup> In deposition, Professor McFadden acknowledged that determining whether Apple had monopoly power at any point in time requires comparing its commission rates to benchmark commission rates *at the same time*. McFadden Deposition, p. 92:1–24. (“Q Well, is it your opinion that Apple acted as a monopolist after opening the App Store and restricted output in the relevant market? .... THE DEPONENT: My -- my opinion is that over the class period that Apple engaged in this

213. A large amount of the transactions present in the developer class period, and most of the transactions during the longer consumer class period, would thus have the same commission rate in the but-for world that Apple charge in the actual world. Using Professor Economides' own methodology of calculating damages, I can calculate what his model would imply is the effect on proposed developer class members that would transact through the App Store or an alternative iOS app transaction platform. I find that using a 30 percent commission rate through October 2017 for non-game app transactions and a 30 percent commission rate for game app transactions through November 2018 results in many proposed developer class members that are unharmed as they had no non-game app transactions after October 2017 and no game app transactions after November 2018.<sup>395</sup> In particular, [REDACTED] of proposed developer class members did not have a paid App Store non-game app transaction after October 25, 2017 or a paid game App Store transaction after November 2018.<sup>396</sup>

214. Thus, applying a 30 percent headline commission rate for game apps prior to November 2018 and for non-game apps prior to October 2017 shows that there are many proposed developer class members who could not have paid more in commissions to Apple due to Apple's challenged conduct and thus could not have suffered lost profits due to Apple's conduct. These developers cannot have suffered damage and would be unharmed by Apple's challenged conduct. While a small number of developers may be able to negotiate a lower commission rate in the but-for world or would choose to distribute directly to consumers, I discuss in Section 8.1 how determining which developers would do so (and which consumers would transact with these developers) requires individualized inquiry.

215. Many proposed consumer class members would be similarly unharmed based on when they transacted through the App Store in the actual world. Since developers would face a 30

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conduct. I -- I have not been asked to break it down by periods. I -- it would be feasible to do that, but I haven't done it. Q. ... Well, just so we're clear, do you have an opinion as to whether or not Apple possessed monopoly power in December of 2008? A. No. My -- my response is I -- I view that as -- as an empirical issue. One would have to simply go and -- and look at what the -- for example, what the rates were in the Apple App Store versus competitive benchmarks, for example, to determine whether they were exercising market power.")

<sup>395</sup> Some developers on the App Store paid a 15 percent commission rate for some transactions prior to November 2018 for game apps and October 2017 for non-game apps. A but-for commission rate based on the headline commission rate of PC app transaction platforms would suggest a single but-for commission rate of 30 percent prior to November 2018 for game apps and prior to October 2017 for non-game apps, even for transactions that paid a 15 percent commission to Apple in the actual world. Thus in the actual world, while Apple charged a 30 percent headline commission rate, it also charged a lower commission rate for certain transactions than that charged by PC app transaction platforms. Apple's business situation could differ in the but-for world and it could choose to maintain just one commission rate, it could choose to introduce additional rates, or it could choose to set entirely different rates for its programs (like the Small Business Program and the Video Partner Program) altogether. However, even if Apple were to adopt two (and only two) commission rates in the but-for world prior to October 2017 or November 2018, as it did in the actual world, if it were to follow the PC app transaction benchmark rates, it is reasonable that the likely lower commission rate in the but-for world would not be lower than 15 percent.

<sup>396</sup> See my workpapers.



percent headline commission rate in the but-for world prior to October 26, 2017, one would not expect that consumer prices charged by developers would have been lower in the but-for world prior to October 26, 2017. Any proposed consumer class member that only made paid transactions through the App Store prior to this date would therefore not have paid a higher price for a paid app or an in-app purchase.

216. I find that [REDACTED] of proposed consumer class accounts in the App Store transaction data did not have a paid App Store transaction after October 25, 2017.<sup>397</sup> These proposed consumer class accounts could not have paid a higher price as a result of Apple's alleged conduct and therefore were not impacted and have suffered no damages.

*6.5.3.2 Steam's current commission rates imply no damage for many proposed developer and consumers class members, who are unharmed by Apple's challenged conduct*

217. Applying a but-for commission rate equal to the commission rates *currently* charged by Steam also results in no damages for many proposed developer and consumer class members, all of whom are unharmed by Apple's challenged conduct.

218. As shown in Section 5.5.2.1, Valve currently charges a 30 percent commission rate for all apps that have generated less than \$10 million in lifetime revenues on Steam. Once an app has reached \$10 million in lifetime revenues on Steam, Valve lowers the commission rate to 25 percent on all future transactions. In addition, once an app has reached \$50 million in lifetime revenues on Steam, Valve further lowers the commission rate to 20 percent on all future transactions. As Professor Economides acknowledged, Steam charges these

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<sup>397</sup> See my workpapers. As I discussed in Section 5.5.2.4, when the Microsoft Store first launched in October 2012, it charged a commission rate of 20 percent for developers with sales in excess of \$25,000. [REDACTED]

As I showed in Figure 10, among proposed developer class members, the majority generated less than \$10,000 in revenues for the *entire* developer class period. In addition, as Professor Economides' Table 4 shows, in 2019 the Microsoft Store's revenue was about [REDACTED]; it is likely that when the Microsoft Store first opened, it had an even smaller share relative to Steam. [REDACTED]

Identifying which developers would pay such a commission rate, if any, in the but-for world (and the proposed consumer class accounts that would transact with these developers) would require individualized inquiry. However, to conservatively account for the possibility that some developers may pay such a commission rate in the but-for world, I consider proposed consumer accounts that only transacted entirely before October 26, 2012 or between January 1, 2015 and October 25, 2017. I find that [REDACTED] transacted entirely during these time windows, representing a minimum of proposed consumer class accounts that would be unharmed. See my workpapers.



commission rates, including the 30 percent commission rate, even though the Epic Games Store entered in 2018 and set a lower commission rate.<sup>398</sup>

219. While I do not know the specific commission rates that Apple or potential iOS app transaction platforms would set in the but-for world, it is reasonable to consider whether proposed class members would be harmed by Apple's challenged conduct if the but-for commission rates adopted by Apple were similar in nature to Steam's commission rate structure, which Plaintiffs have acknowledged was set in a competitive context.<sup>399</sup> I show that even if one focuses only on Steam's current structure, which changed to systematically offer discounts only to large developers, and applies that structure to the whole class period, many proposed class members would be unharmed.<sup>400</sup> Again, following Professor Economides' formula for determining harm and calculating damages, I apply the but-for commission structure based on the revenues for each app observed in the Apple transaction data to determine whether his model finds that proposed developer class members would be

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<sup>398</sup> Economides Deposition, pp. 210:24–211:7 (“Q. Well, when you say it appears that Steam reacted, are you denying that Steam retained its default 30 percent commission rate? THE DEPONENT: I'm not denying that. But it -- it looks like there was some reaction, at least, to -- to try to -- to achieve as much as possible no loss of market share.”).

<sup>399</sup> Economides Report, ¶ 35 (“The Windows PC app distribution market also features evidence of competition that is not present in the iOS app distribution market. The owner of the operating system, Microsoft, does not impede or lock out rival stores either by contractual or technical means. There are a variety of distribution options, including (a) app stores offering 3rd party distribution: for example, the Steam Store, the Epic Games Store, and the Microsoft Store; (b) self-distribution platforms, such as Battle.net (Activision Blizzard) or Origin (EA); and (c) small-scale self-distribution solutions such as the Humble Widget.”); Elhauge Report, ¶ 113 (“As Prof. Economides discusses in his report, the Windows app distribution market is free of the challenged conduct, and consequently is much more competitive than the domestic iOS app distribution market. In the Windows app distribution market, multiple app distributors, such as Steam, the Epic Game Store, and the Microsoft Store, generate significant commissions from the distribution of other developers apps, and many developers self-distribute their Windows apps.”); McFadden Report, ¶¶ 155–157. Professor Economides also stated that it was conceivable that some platforms could charge different tiers based on developer size in the but-for world. Economides Deposition, p. 203:11–24 (“Q. ... In the but-for world, would larger developers, for example, those who have apps that earn more than \$10 million in revenue, receive lower commission rate? A. Well, that's conceivable. But this is not necessarily a part of my calculation. I am calculating an average rate, and that's what I think is -- is correct. But as you did see, the average rate comes partly through Steam, and Steam has a variation of tiers. So it's not -- it's not inconceivable that there will be some variation in tiers, but the average developer should expect to get 14-1/2 percent.”).

<sup>400</sup> It is reasonable to consider whether proposed class members are harmed if Apple would adopt this commission rate structure in the but-for world even if there are other potential iOS app transaction platforms that charge a lower commission rate and if there is direct distribution in the but-for world. This is because, as Professor McFadden and Professor Economides argue, Steam has chosen to set these rates while facing competition from other PC app transaction platforms that charge lower commissions as well as from direct distribution. See Economides Report, ¶ 36 (“The Windows PC app distribution market also features evidence of competition that is not present in the iOS app distribution market.”); McFadden Report, ¶¶ 156–158 (“What has happened to games app stores on the PC platform in the last few years is particularly relevant. ... Just days before the Epic Game Store announcement, Steam announced that it was reducing its commission rate for high-revenue games. ... An equity research report at the time noted that Steam's reduction was ‘likely in anticipation of Epic's announcement.’ ... On April 29, 2021, Microsoft announced that it would reduce the commission charged on its Microsoft Store for PCs from 30 percent to 12 percent for game developers beginning August 1st, 2021. ... Press coverage characterized the commission drop as ‘a clear bid to compete with Steam and entice developers and studios to bring more PC games to its Microsoft Store.’”).

harm by Apple's challenged conduct in a but-for world in which Apple's commission rates were similar to Steam.

220. In particular, any app that generated less than \$10 million in lifetime revenue through the App Store would have paid a 30 percent commission rate on all transactions through the App Store in the but-for world. I find that [REDACTED] of proposed developer class members only transacted apps on the App Store that earned less than \$10 million in lifetime revenue through the App Store.<sup>401</sup> Thus, these developers could not have paid more in commissions to Apple due to Apple's challenged conduct and thus could not have suffered lost profits due to Apple's conduct.

221. Many proposed consumer class members would similarly be unharmed in a but-for world in which the App Store adopted a commission structure similar to Steam's. In particular, since apps that earned less than \$10 million in lifetime revenue on the App Store would not pay a lower commission rate in the but-for world, their developers are unlikely to charge a lower price to consumers for apps based on a lower commission rate in the but-for world. Any proposed consumer class member that continued to transact with these apps *only* through the App Store would therefore not have paid an overcharge on these transactions.

222. I find that [REDACTED] of proposed consumer class accounts in the Apple Transaction data only had paid transactions with apps that have earned less than \$10 million in lifetime revenue through the App Store.<sup>402</sup> Assuming a but-for commission structure similar to Steam, these consumers would not have paid an overcharge and would not be impacted by Apple's alleged conduct.<sup>403</sup> Professor Prince conducts a similar analysis utilizing Professor McFadden's model and applying a commission rate structure similar to Steam. He finds that the number of consumer accounts unharmed is [REDACTED]<sup>404</sup>

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<sup>401</sup> See my workpapers. These calculations are based on lifetime revenues through the App Store's U.S. storefront due to the data available to me. To approximate whether considering an app's worldwide revenue through the App Store would impact the results, I calculated the ratio of aggregate App Store revenues through the U.S. storefront to aggregate worldwide App Store revenues. This ratio was [REDACTED]. See Apple Presentation, "App Store Business Management FY20 Overview," October 2019, APL-APPSTORE\_10176241-337 at -245, -249 [REDACTED]. Assuming that every app had worldwide revenues equal to [REDACTED] U.S. storefront revenues, then any app with U.S. storefront lifetime revenues below approximately [REDACTED] would have less than [REDACTED] worldwide App Store revenues. I find that [REDACTED] of proposed developer class members only transacted apps on the App store that earned less than [REDACTED] through the U.S. storefront. I also find that [REDACTED] of proposed consumer class accounts only made paid transactions with developers that earned less than [REDACTED] in revenues through the U.S. storefront.

<sup>402</sup> See my workpapers.

<sup>403</sup> This is a very conservative lower bound on the number of consumers that could not have been harmed if Apple's but-for commission rate structure were the same as Steam's since it does not account for the fact that consumers may not pay an overcharge on transactions for developers that earned more than \$10 million in revenues in a year.

<sup>404</sup> Expert Report and Declaration of Jeffrey T. Prince, Ph.D., August 10, 2021 ("Prince Report"), Exhibit 1.

223. It is possible, of course, that some potential iOS app transaction platforms would choose to set a different commission rate than the Steam structure, as is observed for the Epic Games Store. However, as I will discuss in Section 8.1, determining whether a proposed developer and consumer class member would choose to transact through a platform with a lower commission rate would require individualized inquiry. For example, many developers (and in turn, those developers' consumers) choose to continue to transact through Steam even though a PC app transaction platform with a lower commission rate (the Epic Games Store) is available. Thus, determining whether developers and consumers would transact on an alternative iOS app transaction platform with a lower commission rate would require individual inquiry.

224. It is also possible that some select developers may choose to distribute apps directly to consumers if their distribution costs were lower than what it would cost them to transact through an app transaction platform (and they were willing to forgo the benefits of transacting through an app transaction platform). As I discuss in more detail in Section 8.1, Plaintiffs' experts have presented no method to determine whether developers would seek out an alternative to the App Store if it adopted the Steam rate structure, how many developers would do this, which developers would do this, or which developers would choose to transact through multiple platforms instead of just one. By extension, Plaintiffs' expert have presented no method to determine whether consumers would transact with developers through an alternative iOS app transaction platforms, either because that was the only option for a particular transaction or because consumers could choose between multiple platforms for a particular transaction.

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225. I have shown that there are many unharmed proposed developer and consumer class members when one considers scenarios in which the App Store and other iOS app transaction platforms adopt but-for commission rates that are based on market facts (i.e., commission rate levels and structures observed across a variety of app transaction platforms seen in the actual world in settings free of the challenged conduct). These scenarios show that Plaintiffs' experts' conclusions on classwide harm are highly sensitive to their unrealistic assumptions regarding average but-for commission rates. That said, they do not resolve the fundamental issue: the Plaintiffs' experts have offered no method to determine what but-for commission rates would be for any given app transaction and have actively ignored both the existing levels and variation of commission rates across app transaction platforms in the real world that are free of the challenged conduct (see Section 5.5). In summary:

- **Commission rates similar to top Android platforms.** If the App Store and other iOS app transaction platforms were to charge but-for commission rates similar to the headline commission rates charged throughout the class periods by Google Play, the Amazon Appstore, and the Samsung Galaxy Store, then nearly all proposed developer class members would generally pay the same commission rates in the but-for world as in the actual world. With the exception of proposed developer class members that may: (i) transact through smaller potential iOS app transaction platforms, (ii) distribute directly to consumers, or (iii) negotiate an individualized commission rate, **nearly all proposed developers class members would be unharmed.** By extension, **nearly all proposed consumer class members would be unharmed.** To identify those, if any, that were harmed would require individualized inquiry.
- **Commission rates similar to the Mac App Store.** If the App Store were to charge but-for commission rates similar to the headline commission rates charged by the Mac App Store throughout the class periods, then any proposed developer class member that transacts entirely through the App Store in the but-for world would pay the same commission rate in the but-for world as in the actual world. If a similar proportion of proposed developer class members chose to transact entirely through the App Store as those who transact entirely through the Mac App Store, then **21 percent of proposed developer class members would transact entirely through the App Store and therefore would be unharmed.** Individualized inquiry would be required to determine which, and how many, proposed consumer class members would make all of their transactions through the App Store.
- **Commission rates similar to prevailing headline commission rates on top PC app transaction platforms throughout the class periods.** If the App Store and other iOS app transaction platforms were to charge but-for commission rates throughout the class periods that were similar to the prevailing headline commission rates on PC app transaction platforms (i.e., Steam and the Microsoft Store) throughout the class periods, then there would be no harm to any proposed developer class member that had no non-game transactions after October 25, 2017 and no game app transactions after November 30, 2018. My analysis shows that this is true for [REDACTED] of proposed developer class members, meaning [REDACTED] **of proposed developer class members would be unharmed.**<sup>405</sup> In addition, my analysis shows that [REDACTED] **of proposed consumer accounts transacted entirely before October 26, 2017 and therefore would be unharmed.** Additional proposed developer and

<sup>405</sup> The only exceptions would be proposed class members who only transacted before 2018 and in the but-for world would have (i) transacted through smaller potential iOS app transaction platforms, (ii) transacted directly, or (iii) transacted on a platform in which the developer had negotiated an individualized commission rate. Individualized inquiry would be required to determine which proposed class members would have done so.

consumer class members who transacted after these dates or in both periods could also be unharmed and would need to be identified by individual inquiry.

- Commission rates similar to Steam’s current tiered commission rate structure.** If the App Store were to charge but-for commission rates throughout the class periods that were similar to Steam’s *current* tiered commission rate structure, then any app from a proposed developer class member that had less than \$10 million in lifetime revenues would pay the same commission rate in the but-for world as in the actual world (i.e., 30 percent). My analysis shows that [REDACTED] **of proposed developer class members would be unharmed** because they did not have any apps with more than \$10 million in lifetime revenues through the App Store’s U.S. storefront and therefore could not suffer any injury if they continued to transact entirely through the App Store. In addition, my analysis shows that [REDACTED] **of proposed consumer class accounts would be unharmed** as they only made paid transactions with apps that had less than \$10 million in lifetime revenues and therefore could not suffer any injury if they continued to transact entirely through the App Store.<sup>406</sup> Individualized inquiry would be required to determine which proposed developer and consumer class members would not transact through the App Store in the but-for world. Moreover, additional proposed developer and consumer class members may also be unharmed.
- Commission rates based on Professor Economides’ rival profit yardstick, but using actual shares rather than his arbitrary, assumed shares.** If Professor Economides’ rival profit yardstick method were to be updated to use estimates of actual shares (i.e., the Epic Games Store’s sales compared to other PC app transaction platforms), rather than the shares that Professor Economides arbitrarily assumed, the but-for commission rate predicted by his flawed methodology would be 34.6 percent. Thus, using his approach, but reflecting the Epic Games Store’s actual share of sales would predict that **100 percent of proposed developer class members and 100 percent of proposed consumer class members would be unharmed.**

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<sup>406</sup> See my workpapers. Because Steam’s commission rate tiers are based on worldwide revenue, I have also considered a sensitivity where the thresholds for lower commission rate tiers are adjusted by the proportion of App Store revenue through the U.S. storefront compared to worldwide App Store revenue. Under this scenario, I find that [REDACTED] developer class members and [REDACTED] of proposed consumer class accounts would be unharmed. See footnote 401.

**7. PLAINTIFFS’ EXPERTS’ ANALYSES OF CLASS CERTIFICATION ARE INCORRECTLY PREMISED ON A SINGLE MARKET THAT COMBINES ALL IOS APPS TOGETHER AND SIMULTANEOUSLY IGNORES ALL APP TRANSACTIONS OTHER THAN IOS**

226. Plaintiffs’ experts all present analyses for class certification premised on a single market for iOS app distribution (defined to include both initial downloads and in-app purchases of digital products) encompassing all iOS apps but limited to only iOS app transactions.<sup>407</sup> Such a market definition is incorrect, does not reflect market realities, and prevents Plaintiffs’ experts from correctly analyzing whether Apple has market power that would allow it to charge an anti-competitive commission rate that could impact proposed developer and consumer class members.<sup>408</sup>

227. Here, it is of critical importance to determine what options developers and consumers have for transacting with each other beyond downloading an iOS app and transacting through an iOS app on an iOS device, as this will determine what substitute competitive options are available for developers and consumers and what competitive pressures constrain Apple’s pricing. The answer to this question is fact-based and, as I explained in *Epic v. Apple*, will not be the same for every sort of developer, app, or consumer.<sup>409</sup>

228. Plaintiffs’ experts’ market definitions suffer from two simultaneous flaws. First, their markets are too broad, as their iOS app distribution markets combine app transactions across all types of apps, ranging from transactions for games, dating apps, and music apps to transactions for utility apps, photography apps, and more.<sup>410</sup> As I explained in *Epic v. Apple*

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<sup>407</sup> McFadden Report, ¶ 42 (“Common economic evidence supports the conclusion that there exists a relevant antitrust market for selling consumers iOS apps and in-app content, which are relevant products in this market.”); Elhauge Report, ¶ 28 (“I conclude that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services.”), and ¶ 30 (“...the evidence shows that the relevant product (iOS app distribution) is the same for both games and non-games.”); Economides Report, ¶ 10 (I understand that Prof. Elhauge has opined that the relevant market in this case is the market for domestic iOS app and digital in-app-purchase (IAP) distribution services, including all the ways that developers can distribute native apps to users of iOS devices in the United States. ... I have read his market definition analysis and find that his conclusions are sound.”).

<sup>408</sup> Professor Economides acknowledged at his deposition that he would need to redo his analyses if the finder of fact found a different market than the one he assumed. Economides Deposition, p. 87:2–12 (“Q. If the finder of fact determines that there are half a dozen different relevant markets at issue in this case, would that affect your conclusion about damages? A. ... If the finder of fact finds something completely different, then I would have to redo my calculation.”).

<sup>409</sup> Hitt *Epic* Report, Section 3.7.2.

<sup>410</sup> Elhauge Report, ¶ 28 (“I conclude that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services.”); Elhauge Report, ¶ 153 (“[T]here are not separate markets for the distribution of games versus non-games.”); Economides Report, ¶ 10 (“I understand that Prof. Elhauge has opined that the relevant market in this case is the market for domestic iOS app and digital in-app-purchase (IAP) distribution services, ... I have read his market definition analysis and find that his conclusions are sound.”); McFadden Report, ¶ 42 (“Common economic evidence supports the conclusion that there exists a relevant antitrust market for selling consumers iOS apps and in-app content, which are relevant products in this market.”).



it is inappropriate to cluster together transactions for all types of apps into a single market as Plaintiffs' experts have done.<sup>411</sup> This is because the available substitutes, as well as competitive conditions, are different across different app transactions.

229. Second, their markets are too narrow, as they only consider transactions of iOS apps while ignoring other ways in which developer and consumers can transact for the same app content.<sup>412</sup> As I demonstrated in *Epic v. Apple* for digital game transactions, developers and consumers have multiple alternative platforms on which they can transact.<sup>413</sup> Thus, for games it is inappropriate to limit the relevant market to only iOS app transactions if one wants to account for competitive effects. A developer facing what it considers to be excess fees in the App Store could continue to allow consumers to download an app through the App Store but monetize the product outside the App Store, as has been done by Spotify and Netflix, among others.<sup>414</sup> Additionally, a developer facing what it considers to be excess fees in the App Store could therefore allocate some (or all) of its efforts to develop games for other game transaction platforms. These options are also often specific to the developer or the type of app the developer is seeking to make.

230. These two facts combined indicate that the assessment of market definition, and the evidence necessary to define a market, is not common to the proposed developer class or to the proposed consumer class and will require assessing substitute transaction platforms and competitive conditions for the market in which each app transacts. In turn, determining whether a proposed consumer or developer class member was impacted and the amount of damages requires consideration within the specific relevant market for each app transaction.

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<sup>411</sup> Hitt *Epic* Report, Section 3.7.2.

<sup>412</sup> Elhauge Report, ¶ 28 (“I conclude that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services. The distribution of iOS apps includes all the ways that developers can distribute native apps to users of iOS devices in the United States.”); Elhauge Report, ¶ 175 (“All products that do not provide the installation of native iOS apps are outside of the relevant market.”); McFadden Report, ¶ 42 (“[T]here exists a relevant antitrust market for selling consumers iOS apps and in-app content.”); McFadden Report, ¶ 47 (“I consider potential substitutes for downloading and installing iOS apps and making in-app purchases through the Apple App Store and explain that common economic evidence confirms that they are properly excluded from the relevant market... web apps cannot substitute for apps installed through the Apple App Store... installing apps through ‘jailbreaking’ is not a reasonable substitute for installing apps through the Apple App Store... apps compatible with other mobile OSs are not part of the relevant market... purchasing in-app content outside the App Store is not a reasonable substitute for purchasing it through the App Store.”).

<sup>413</sup> Hitt *Epic* Report, Sections 3.1–3.2.

<sup>414</sup> Chris Welch, “Netflix stops offering in-app subscriptions for new and returning customers on iOS,” *The Verge*, December 28, 2018, available at <https://www.theverge.com/2018/12/28/18159373/netflix-in-appsubscriptions-iphone-ipad-ios-apple>, accessed on February 5, 2021 (“Now, customers will have to begin a subscription through a web browser such as Safari... Spotify, the leading subscription music app, has also bypassed Apple’s in-app billing for similar reasons.”). “Apple payments for Spotify,” available at <https://support.spotify.com/us/article/apple-payments/>, accessed on August 6, 2021



231. Here, I provide a summary of market definition analyses that are relevant for consideration of class certification. I first present empirical analyses that show the variation in competitive conditions for transactions across app genres on the App Store. I then discuss two example markets in which the App Store competes to illustrate further how the Plaintiffs' experts' market definitions are too narrow and too broad. I provide more detail on these two example markets in Appendix D.

***7.1. Empirical analyses from the Apple transaction data show that competitive conditions vary across app genres***

232. Plaintiffs have not conducted the relevant empirical analysis to determine whether transactions for all apps can be clustered into a single market.

- Professor Elhauge has not conducted any empirical analysis to support his conclusion that there is a single market for iOS app and in-app purchase distribution. Instead his “empirical” support is a supposed “hypothetical monopolist test” which consists of his observation that Apple’s average commission rates are at least 5 percent above Professor Economides’ flawed “effective commission rate” for PC app transaction platforms.<sup>415</sup>
- Professor Economides does not attempt any analysis of his own to support his market definition and simply adopts Professor Elhauge’s conclusion that there is a market for iOS app and in-app purchase distribution services.<sup>416</sup>
- Professor McFadden offers a number of arguments related to technical restrictions that prevent consumers from using iOS apps obtained from outside the App Store, supposed technical limitations of web apps, purportedly limited switching between Android and iOS smartphones, and allegedly limited substitution between the App Store and other app transaction platforms.<sup>417</sup> However, he conducts no original empirical research to support his market definition and instead relies on Dr. Evans’

<sup>415</sup> Elhauge Report, ¶¶ 112–115 (“[E]vidence indicat[es] that commissions in the domestic iOS app distribution market would be at least 5% lower if there were competition would indicate that this market passes the Hypothetical Monopolist test. Apple’s average commission in the actual world was ██████ which is 5 percent higher than ██████. Therefore, evidence of commissions less than ██████ in more competitive app distribution markets supports the conclusion that the domestic iOS app distribution market is sufficiently broad.”); Economides Report, Table 4.

<sup>416</sup> Economides Report, ¶ 10 (“I understand that Prof. Elhauge has opined that the relevant market in this case is the market for domestic iOS app and digital in-app-purchase (IAP) distribution services, including all the ways that developers can distribute native apps3 to users of iOS4 devices in the United States.... I have read his market definition analysis and find that his conclusions are sound.”). See also Economides Deposition, p. 83:7–10 (“Well, I am not defining a relevant market in the terms of traditional antitrust. I’m taking the antitrust liability as given, and I’m using the market to calculate damages.”).

<sup>417</sup> McFadden Report, Section III.

analysis from *Epic v. Apple* of one particular game app, Fortnite, when it was removed from the App Store.<sup>418</sup>

233. Regardless, Plaintiffs’ experts have not performed any analysis to indicate that there is a single market for all iOS apps and in-app purchases because they never perform any analysis to show that the conditions facing transactions for one app or grouping of apps (such as across apps in the same self-assigned genres) are the same as the conditions facing transactions for another app or group of apps.

234. Plaintiffs have not analyzed whether the available substitutes for transactions for different apps are the same. They also have not analyzed whether the set of developers and consumers for different types of apps are the same, and they have not considered other factors that could influence the ability or propensity of developers or consumers to substitute to other transaction platforms, such as how the characteristics of consumer preferences, like price sensitivity, vary across apps, even for apps within a particular app genre. In fact, Professor McFadden conducts his analysis separately for two groups of apps (game apps, and a combined group of apps from the media and entertainment genres), and he finds different economic conditions prevail for these two groups of apps as well as between initial download transactions and in-app purchase transactions, which is inconsistent with his claim that there is a single market for the distribution of all iOS apps that includes both initial downloads and in-app purchase.<sup>419</sup> Ultimately, Plaintiffs’ experts have in fact provided no evidence to justify clustering transactions for all iOS apps into a single market.

235. Indeed, the evidence shows the opposite—it is incorrect to cluster all app transactions into a single market. While all app developers are able to pursue a variety of monetization strategies including paid downloads, in-app purchases, in-app subscriptions, in-app advertising, and purchases (of content or subscriptions) outside of an iOS app that can be used in the app, certain apps have been more likely to pursue certain business models and monetization strategies. This suggests differences in the benefits of employing each alternative for different types of apps and app transactions.<sup>420</sup> For example, a subscription-based model may lend itself easily to an office suite app that consumers regularly utilize, while a “pay as you go” or “pay for specific content” approach may lend itself better to apps

<sup>418</sup> McFadden Report, Section III.E.3. I note that Professor McFadden relies upon analyses of switching for the game Fortnite contained in Dr. Evans’ opening report in *Epic v. Apple*. Dr. Evans subsequently performed updated analyses of switching for the game Fortnite that he presented in his rebuttal report and at trial in *Epic v. Apple*. Dr. Evans also issued corrections to his analyses of switching for the game Fortnite contained in his opening report in *Epic v. Apple*. Professor McFadden does not address these updated or corrected analyses.

<sup>419</sup> McFadden Report, Section VI.D.

<sup>420</sup> While developers’ typical monetization strategies vary across types of apps, they also vary across developers within a particular type of app.

where additional consumer experience leads to higher demand for paid content (e.g., unlocking features in a photo editor). In some cases, the same content can be provided in both formats, such as in-game consumables which are offered by game developers both as one-off in-app purchases or as part of an ongoing subscription.<sup>421</sup> Such differences in optimal monetization strategies imply, in turn, differences in competitive conditions.<sup>422</sup> I thus look at differences in observed business models and monetization strategies between different types of apps as evidence of whether different app transactions face unique competitive conditions compared to each other. I find that there is significant variation in business models and monetization strategies for different types of apps, indicating differences in competitive conditions for transactions of different types of apps, even among apps that developers self-assign to the same broad App Store app genre. This variation in competitive conditions further indicates that it is inappropriate to cluster all app transactions into a single market, as alleged by Plaintiffs' experts.

236. I use the Apple transaction data for FY2020 to analyze business models and monetization strategies across apps categorized by their developers in a number of different app genres (as defined by Apple) on the App Store. While I analyze apps by genre based on Apple's categories on the App Store, this does not mean that app genres on the App Store correspond to relevant antitrust markets. However, analyzing differences across app genres does demonstrate the different conditions that developers face for making transactions for different types of apps. This can be seen through the different choices developers make for apps from different app genres. This all supports why all apps should not be considered as a single market facing the same competitive conditions. In particular, I analyze:

- Whether developers have chosen to monetize apps through the App Store, which would in part reflect whether developers have the ability to monetize through other methods (such as the sale of physical goods, in-app advertising, or payment outside of the app) that avoid paying a commission to Apple;
- Whether developers choose to monetize through in-app purchases, in-app subscriptions, or both (conditional on monetizing in-app);

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<sup>421</sup> For example, the game Fortnite offers purchases of V-bucks as well as an ongoing subscription called Fortnite Crew. Epic Games, "Fortnite Crew: the Ultimate Fortnite Offer," available at <https://www.epicgames.com/fortnite/en-US/fortnite-crew-subscription>, accessed on August 9, 2021 ("Joining the Fortnite Crew gets members everything below for only \$11.99 each month... Each month you'll receive 1,000 V-Bucks that you can put towards the hottest outfits, emotes and more. And with the included battle pass, you'll be able to unlock even more V-Bucks!").

<sup>422</sup> If consumers are more interested in long-term use of an app, a developer may find in-app subscriptions as a superior monetization approach. This may in turn make even more attractive certain alternatives for how a developer would pursue collection of the subscription fee outside the App Store (which may come as infrequently as once a year).

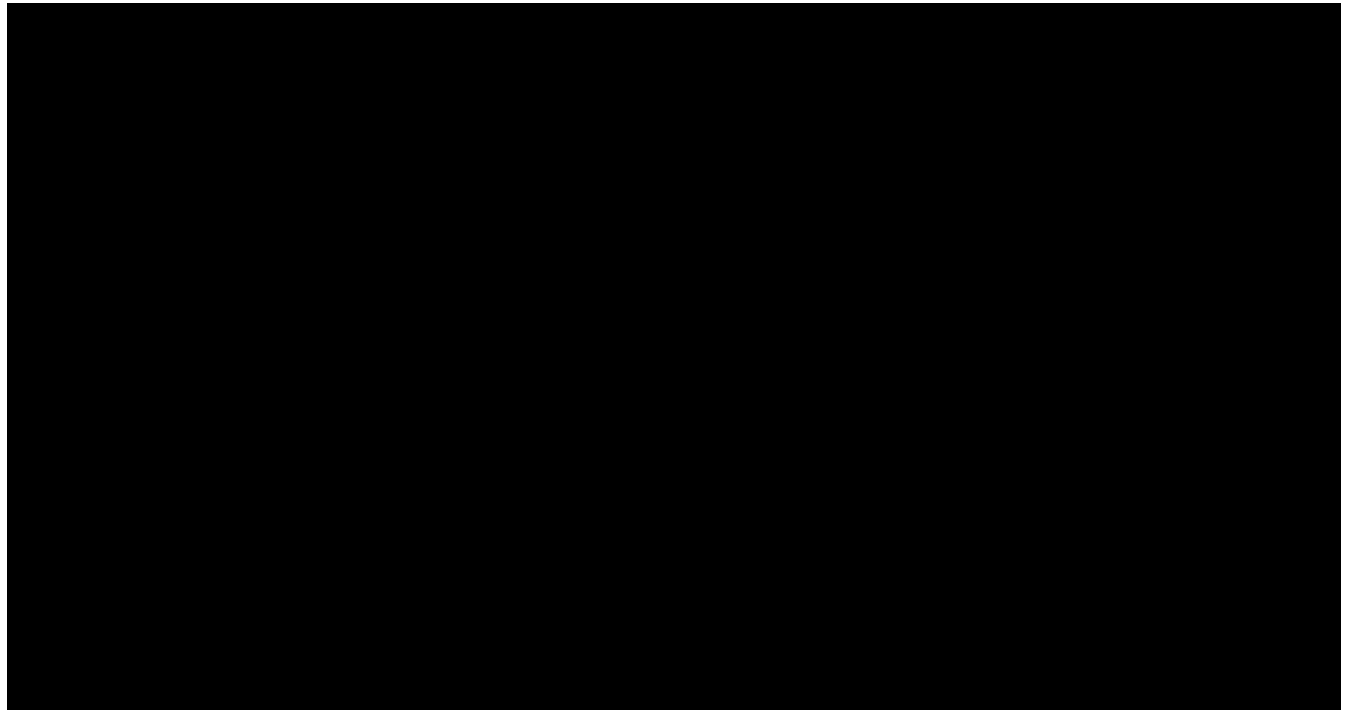
- The prevalence of free app downloads and the average effective commission rate developers paid to Apple, which would reflect differences in monetization strategies, for different types of apps as well as different commissions charged by Apple; and
- Whether the same app developers and consumers transact in multiple app genres.

*7.1.1. Apps vary based on whether they have monetized through the App Store*

237. Figure 24 shows the proportion of apps by app genre in the App Store that were free-to-download and did not have in-app purchases (and thus did not monetize at all through the App Store and paid no commissions). While most apps do not generate any revenue from transactions through the App Store, apps in different genres have different likelihoods to have monetized through the App Store. For example, only [REDACTED] of business apps are monetized through the App Store (in other words, almost all developers are earning money from their app by monetizing in other ways, or transacting with consumers in other places) while in contrast almost one-third of photo and video apps monetize directly through paid transactions in the App Store.

**FIGURE 24**

*Percent of apps that are free-to-download without in-app purchases by genre (October 1, 2019 – September 30, 2020)*



Source: Apple Transaction Data

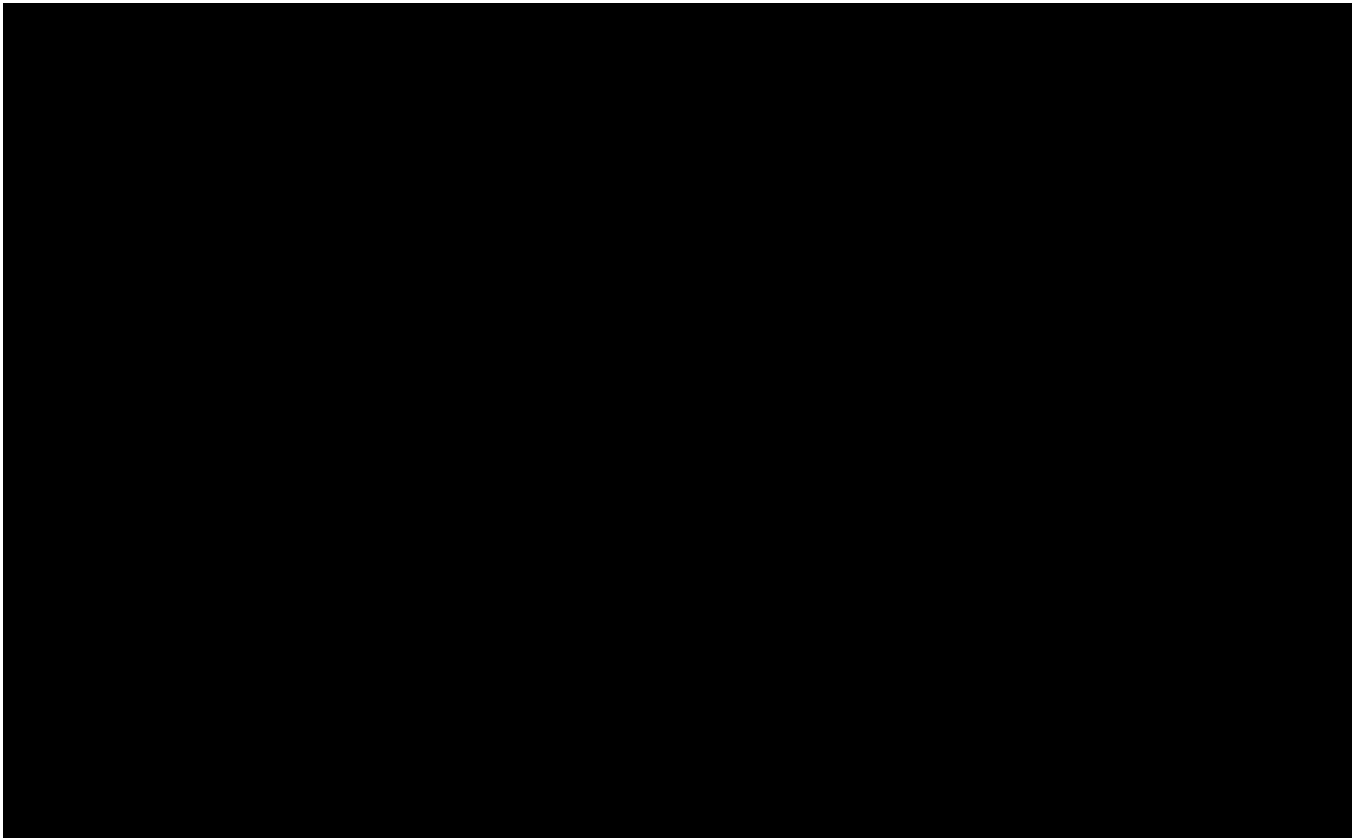
Note: A free-to-download app without in-app purchase is defined as a free-to-download app that has no in-app purchases in FY2020. A free-to-download app is an app with at least one free download during FY2020. Only original transactions from in-app purchases and initial downloads are included. Transactions where Apple is the developer are excluded. The percent of apps that are free-to-download without in-app purchases is calculated over the sum of apps across all three monetization type categories (i.e., free-to-download apps without in-app purchases, free-to-download apps with in-app purchases, and paid-to-download apps). See Appendix F for details regarding Apple transaction data processing.

*7.1.2. Apps differ based on whether they use non-subscription or subscription in-app purchases, conditional on monetizing through in-app purchases*

238. Figure 25 shows the distribution of revenues generated by non-subscription in-app purchases and subscription in-app purchases. As can be seen, [REDACTED] of in-app revenues for game apps are from non-subscription in-app purchases. In contrast, nearly all other app genres shown generate the majority of their revenue on the App Store from subscription in-app purchases, with many almost exclusively using subscriptions. However, even across non-game genres, the share of in-app purchase revenues that is from subscriptions varies – genres such as sports and lifestyle have more than [REDACTED] percent of revenues from non-subscription purchases while genres such as music and health fitness have [REDACTED] of their in-app purchase revenues (over [REDACTED] percent) from subscriptions. Thus, different app genres differ dramatically in how they generate in-app revenue.

**FIGURE 25**

*Percent of in-app purchase revenue by App Store monetization type and genre (October 1, 2019 – September 30, 2020)*



Source: Apple Transaction Data

Note: Only apps with at least one original in-app purchase transaction and at least one original initial download transaction are included. Transactions where Apple is the developer are excluded. Revenue is total billings from in-app purchases. The percent of each in-app purchase monetization type is calculated over total in-app purchase revenue. See Appendix F for details regarding Apple transaction data processing.

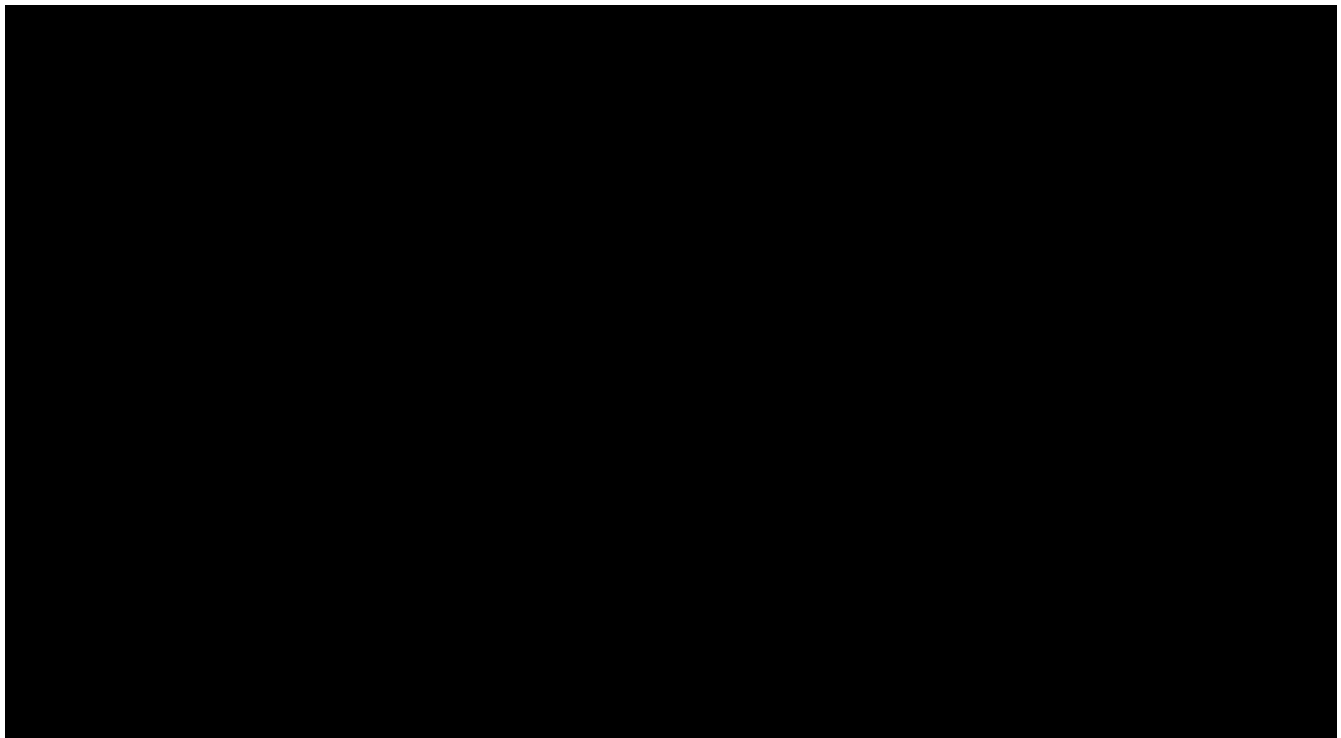
*7.1.3. The prevalence of free app downloads and effective commission rates differ across app genres*

239. Figure 26 shows the percent of app downloads, by genre, that were free in FY2020 and thus do not incur a commission to Apple for the download transaction. While most app downloads are free for all app genres, the share of app downloads that are free is relatively lower for some app genres, such as [REDACTED]. [REDACTED] Meanwhile, [REDACTED] of app downloads are free in app genres like [REDACTED].

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**FIGURE 26**

*Percent of downloads that are free through the App Store, by genre (October 1, 2019 – September 30, 2020)*



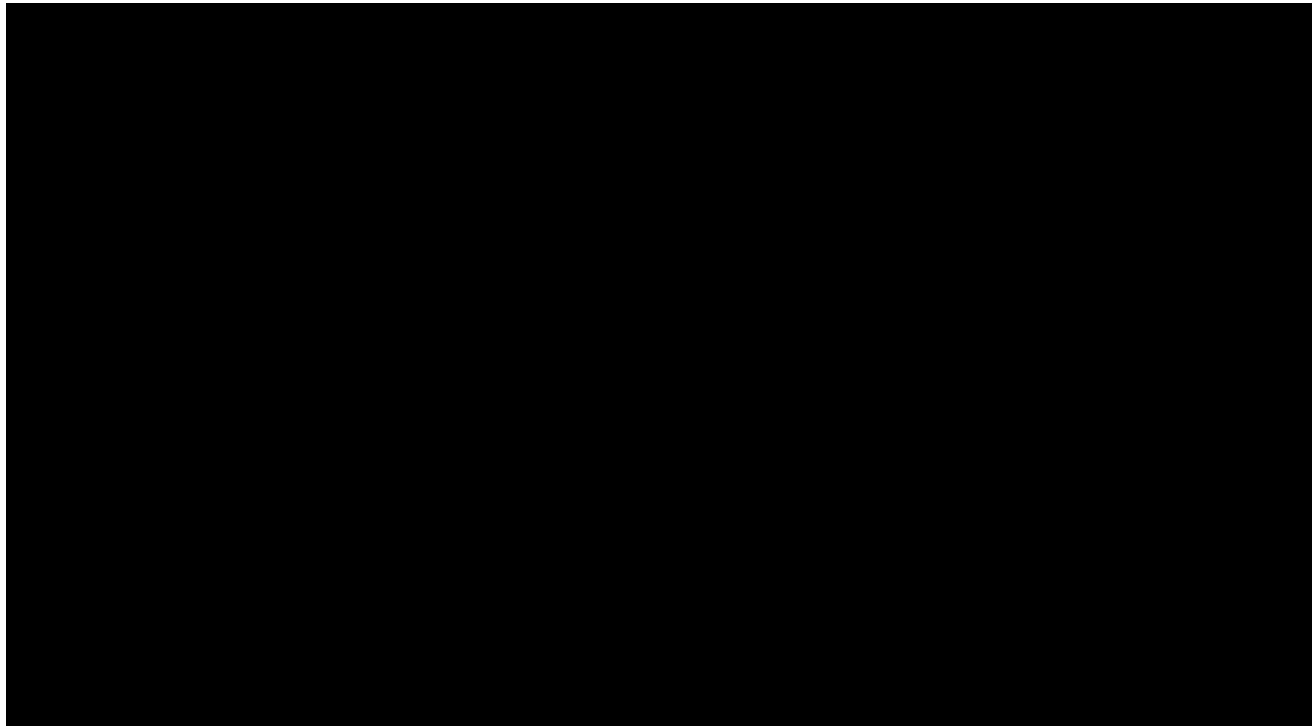
Source: Apple Transaction Data

Note: Only original transactions from initial downloads are included. Transactions where Apple is the developer are excluded. See Appendix F for details regarding Apple transaction data processing.

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240. Figure 27 shows the average commission rate paid by developers for paid in-app purchases by app genre in FY2020. The average commission rate for in-app purchases range between [REDACTED] showing differences in how developers monetize, and whether they use subscription or non-subscription in-app purchases.



**FIGURE 27***Average paid in-app purchase commission rate by genre (October 1, 2019 – September 30, 2020)*

Source: Apple Transaction Data

Note: Commission rate is calculated for each transaction, and a simple average is calculated across transactions. Only original transactions with a billing amount greater than 0 from in-app purchases are included. Transactions where Apple is the developer are excluded. See Appendix F for details regarding Apple transaction data processing.

*7.1.4. App developers that transact in different genres differ*

241. Empirical evidence also shows that distinct populations of developers engage in app transactions for particular genres. As I showed in *Epic v. Apple*, the vast majority of the revenue generated by developers who make iOS game apps comes from game apps.<sup>423</sup> As I also showed, developers of iOS game apps often make different games for multiple platforms or make a single game available on multiple platforms.<sup>424</sup> Thus they do not focus on making apps for many genres within iOS, rather they make games for many different platforms and operating systems.

242. Figure 28 shows the proportion of developers that offer apps in a particular genre that *only* offer apps in that genre. For example, out of the [REDACTED] developers in the proposed class that made transactions for a game app on the App Store in the class period, [REDACTED] percent

<sup>423</sup> Hitt *Epic* Rebuttal Report, Exhibit 17.

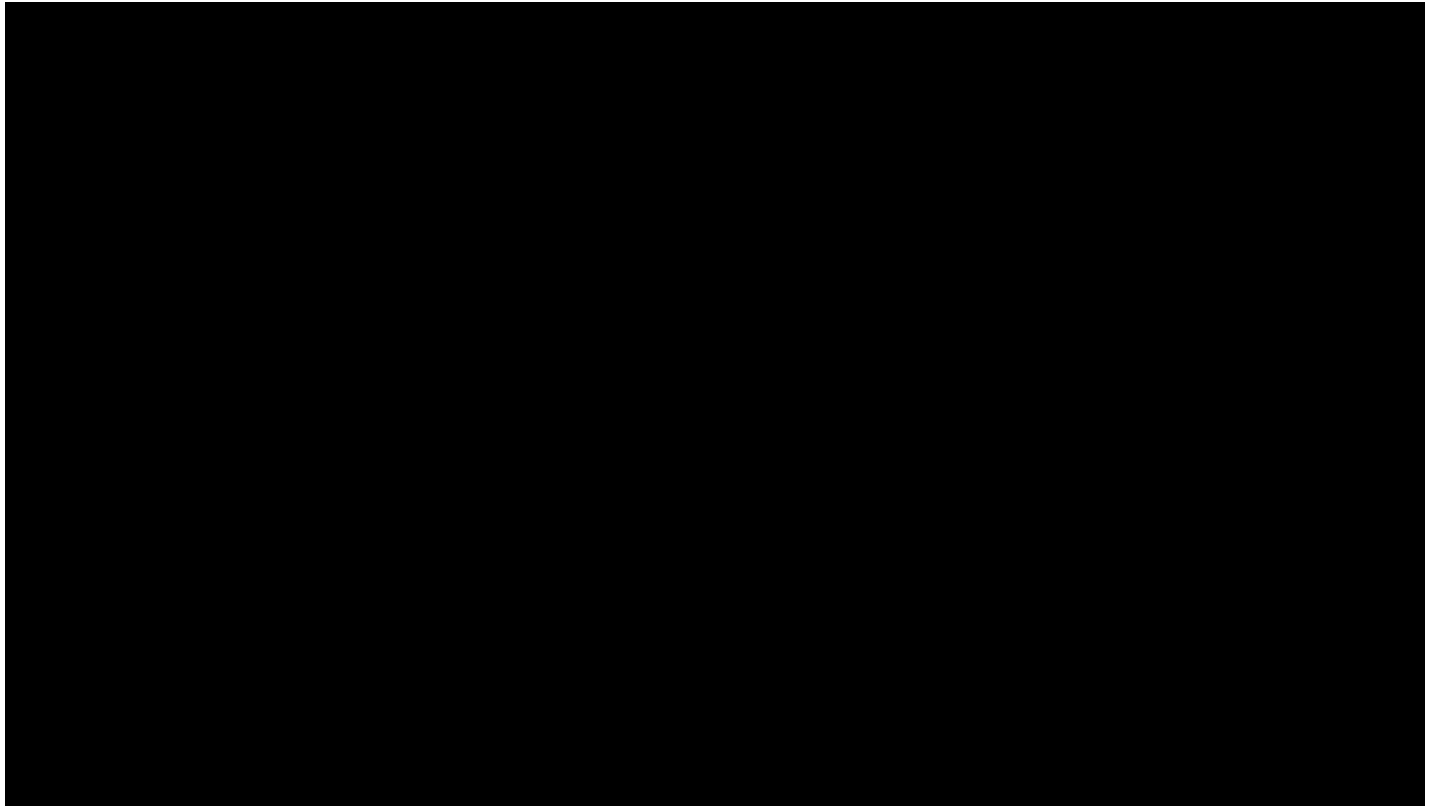
<sup>424</sup> See, for example, Hitt *Epic* Rebuttal Report, Exhibits 3 and 4, and ¶¶ 75–77, 84–85.

offered *only* game apps.<sup>425</sup> Moreover, [REDACTED] percent of developers that offered more than one app through the App Store offered *only* game apps.<sup>426</sup> Developers of apps in other app genres, such as health and fitness, magazines and newspapers, stickers, and sports, are similarly concentrated in individual app genres and do not develop apps for other genres.

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**FIGURE 28**

*Distribution of single genre developers through the App Store, by genre (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only original transactions from downloads are included. Only developers in the proposed class are included. Data is limited to apps and developers with at least one app download, for a total of [REDACTED] in the proposed class. A multi-app developer is a developer with more than one unique app downloaded. No developers are exclusive to the catalog genre. See Appendix F for details regarding Apple transaction data processing.

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243. Figure 29 shows further information about the variety of apps offered by proposed developer class members. [REDACTED] of proposed developer class members offered apps in just one app genre during the class period. [REDACTED]  
[REDACTED]  
[REDACTED] Of

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<sup>425</sup> See my workpapers.

<sup>426</sup> See my workpapers.

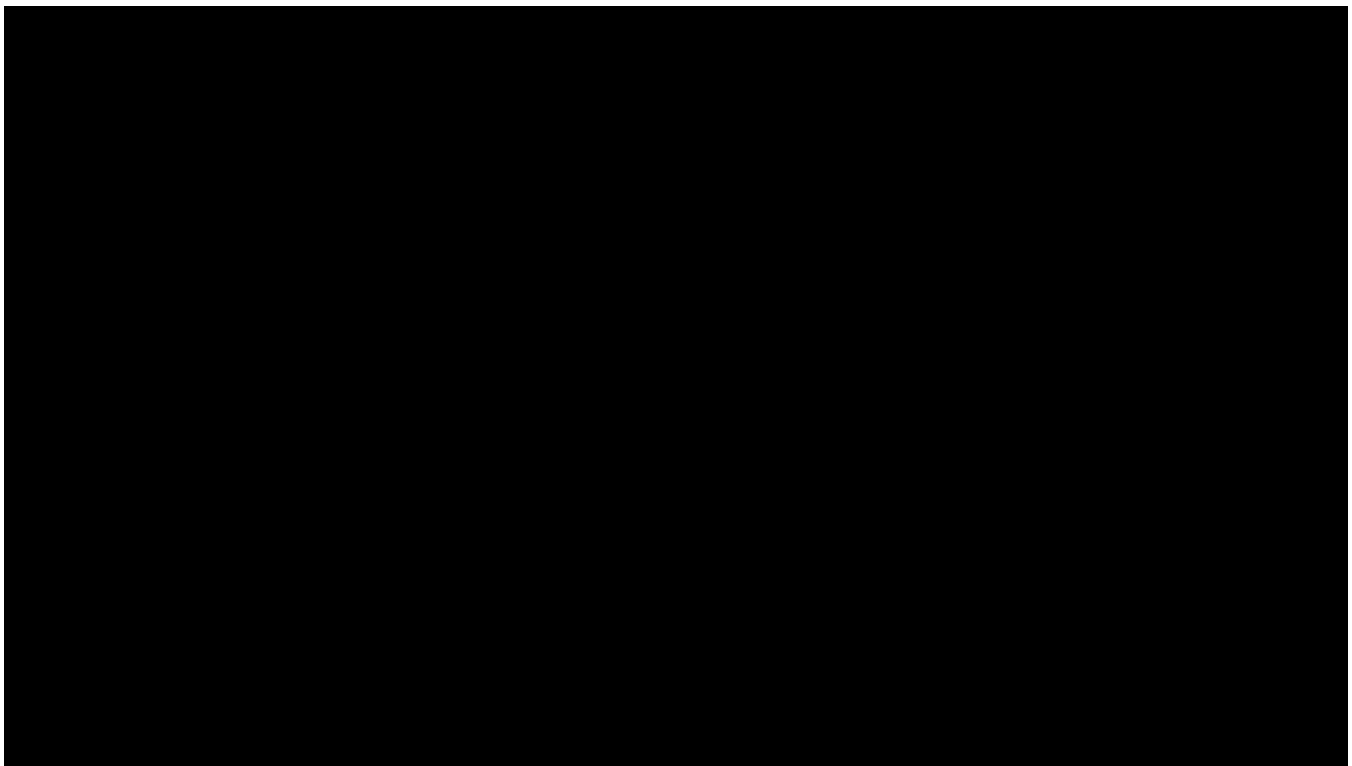
the developers who offered multiple apps, [REDACTED] offered multiple apps within the same genre.<sup>427</sup>

244. However, about [REDACTED] of proposed developer class members offer apps across two or more app genres. For example, Amazon offers apps in multiple app genres, including shopping (e.g., Amazon Shopping), entertainment (e.g., Amazon Prime Video), music (e.g., Amazon Music), lifestyle (e.g., Amazon Alexa), books (e.g., Amazon Kindle), photo and video (e.g., Amazon Photos), utilities (e.g., Amazon Fire TV), food and drink (e.g., Amazon Prime Now), and more.<sup>428</sup>

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**FIGURE 29**

*Distribution of number of genres by developer through the App Store (June 4, 2015 – April 25, 2021)*



Source: Apple Transaction Data

Note: Only original transactions from downloads are included. Only developers in the proposed class are included. Data is limited to apps and developers with at least one app download, for a total of [REDACTED] apps are associated with multiple content\_provider\_ids. See Appendix F for details regarding Apple transaction data processing.

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<sup>427</sup> See my workpapers.

<sup>428</sup> Apple, “App Store Preview: AMZN Mobile LLC,” available at <https://apps.apple.com/us/developer/amzn-mobile-llc/id297606954>, accessed on July 28, 2021.

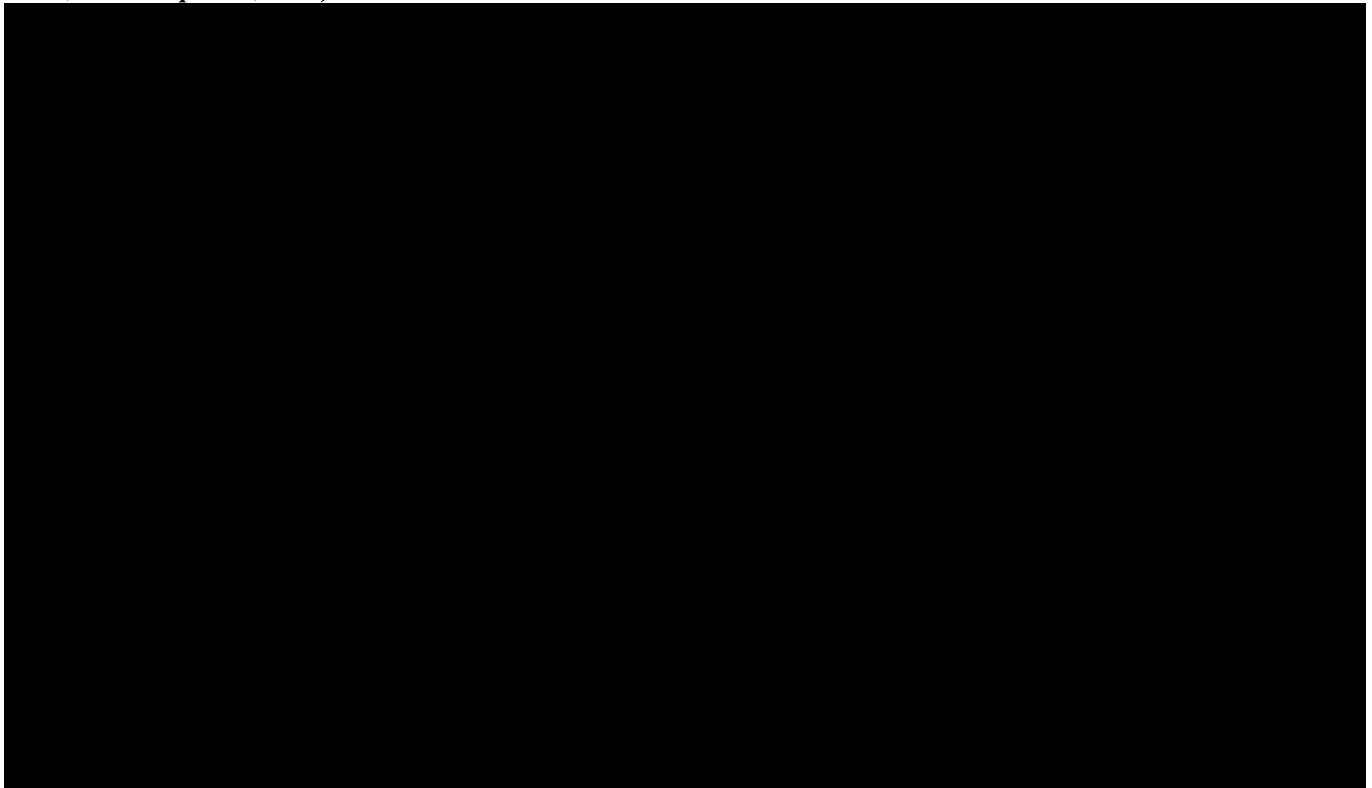
### 7.1.5. Consumer accounts that transact in different genres differ

245. Many consumers also transact through the App Store only for specific app genres. Figure 30 shows the distribution of proposed consumer accounts by the number of app genres in which these accounts have actually spent money. As seen in the exhibit, [REDACTED] of consumer accounts only made paid transactions from a single app genre. Another [REDACTED] [REDACTED] consumer accounts only made paid transactions from two app genres.

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#### **FIGURE 30**

*Distribution of proposed consumer accounts by number of genres with spending through the App Store (July 10, 2008 – April 25, 2021)*



Source: Apple transaction data

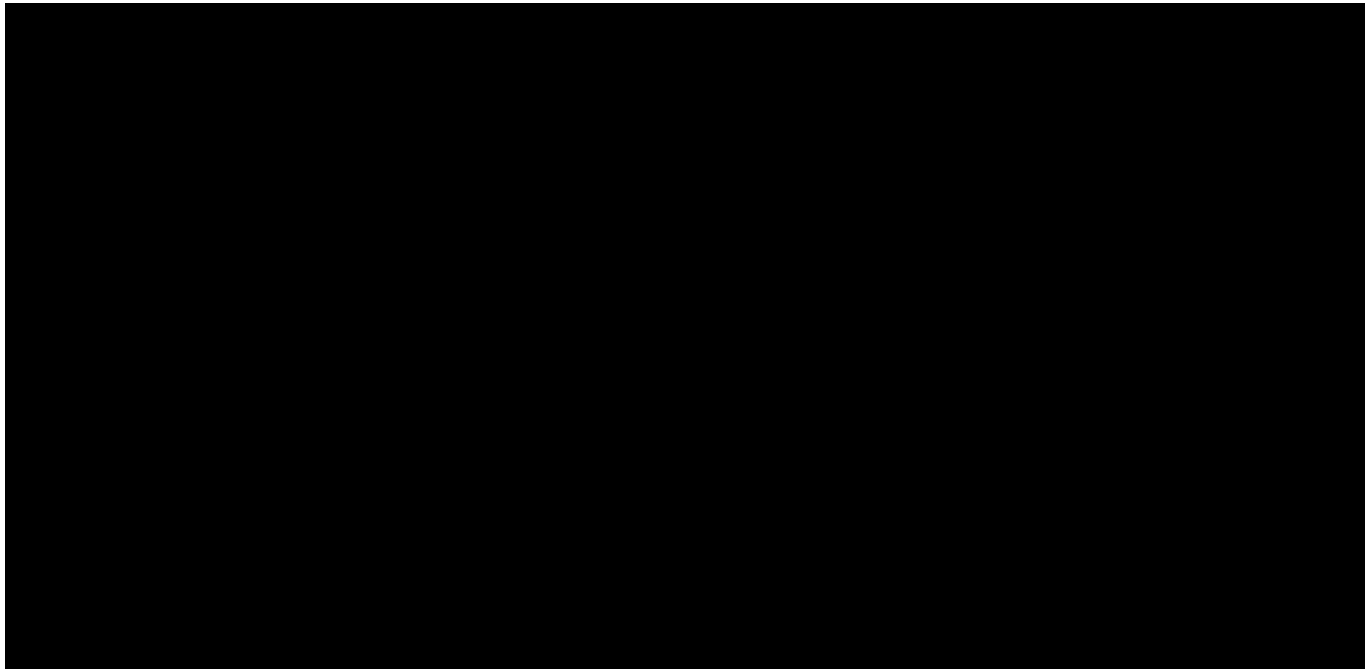
Note: Transactions where Apple is the developer are excluded. The number of original downloads across all genres determines the color categorization. Only accounts in the proposed consumer class are included. 1.7% of accounts had spend without a download. See Appendix F for details regarding Apple transaction data processing.

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246. The proposed consumer class accounts that spend money on paid downloads and/or in-app purchases on a certain app genre often only spend money in that one genre. Figure 31 shows the proportion of consumer accounts that spent money through the App Store on a particular app genre that *only* spent money on apps in that genre. This proportion is particularly pronounced for games: [REDACTED] of consumer accounts that spent money on game apps only spent money on game apps and therefore did not spend money on any other genres.

**FIGURE 31**

*Percent of proposed consumer accounts with exclusive spend by genre through the App Store (July 10, 2008 – April 25, 2021)*



Source: Apple Transaction Data

Note: Transactions where Apple is the developer are excluded. Only accounts in the proposed consumer class are included. See Appendix F for details regarding Apple transaction data processing.

247. To assess whether Apple has market power and whether proposed class members have been impacted, it is necessary to first define the relevant market for the products at issue. My analyses suggest variation in monetization strategies across app transactions and a significant degree of developer specialization within a genre, all of which is consistent with developers facing different competitive conditions across genres for transactions. This demonstrates that it is inappropriate to cluster all app transactions together into a single market and to conclude, as Plaintiffs' experts have done, that there is a single two-sided market that encompasses all transactions for all iOS apps.

248. The analyses presented in this section – about variation in monetization and variation in the degree of specialization of developers – alone would demonstrate that different developers face different competitive conditions for transactions. However, in *Epic v. Apple I* also presented evidence indicating that, at a minimum, there is a separate market for game transactions that is distinct from markets for transactions for other types of apps.<sup>429</sup> Because these extended analyses require specific research efforts into the conditions present in each potential market using data unique to each individual market, in the following sections I

<sup>429</sup> Hitt *Epic* report, Section 3.

present case studies presenting this further evidence that different apps face different competitive conditions for transactions and therefore cannot be reasonably grouped into a single market for all transactions of all iOS apps.

***7.2. Detailed evidence of differences in competitive conditions across app transactions for two different types of apps: game apps and TV and video streaming apps***

249. As explained by Professor Schmalensee, the App Store serves two types of customers in a two-sided market: app developers and consumers who use apps.<sup>430</sup> In addition, as explained by Professor Willig, a market definition exercise seeks to identify products that are “reasonably interchangeable” with the products that are central to the conduct at issue.<sup>431</sup> Thus, in the context of this matter, the goal of a market definition exercise is to identify the set of competing platforms that are substitutes for transacting on the App Store from the perspective of both app developers and app consumers.

250. Professor Elhauge and Professor McFadden both assume that the App Store is a monopoly transaction platform that faces no significant competition with any other app transaction platforms or distribution channels due to Apple’s challenged conduct.<sup>432</sup> However, as I will show, app transaction platforms like the App Store compete against other app transaction platforms as well as with direct distribution by developers. The set of competing platforms that serves as substitutes to the App Store for both developers and consumers, however, varies based on the type of app transaction. The set of plausible substitute transaction platforms to the App Store for some types of transactions, such as game app transactions, will differ from the set of plausible substitute transaction platforms for other types of transactions, such as TV and video streaming app (“video streaming app”) transactions. Similarly, as I showed in the prior section, differences in developers’ ability to transact on alternative app transaction platforms and differences in developers’ monetization strategies mean that the ability of substitute transaction platforms to constrain Apple’s challenged conduct will differ across apps.<sup>433</sup>

<sup>430</sup> Schmalensee Report, Section VII.D.

<sup>431</sup> Expert Report and Declaration of Robert D. Willig, Ph.D. August 10, 2021, (“Willig Report”), ¶ 54.

<sup>432</sup> See, for example, Elhauge Report, ¶7.D (“Apple has possessed monopoly power (and thus necessarily market power) in the U.S. market for iOS app and digital IAP distribution services throughout the Class Period.”); McFadden Report, ¶108 (“Common economic evidence supports the conclusion that Apple has used its (aftermarket) market power to restrict the sale of iOS apps and in-app content outside of the App Store. The App Store is the only place on the iOS devices where iOS device consumers can purchase apps and in-app content. As a result of Apple’s restrictions, (almost) 100 percent of iOS apps are purchased from Apple’s App Store [...]”).

<sup>433</sup> See Section 7.1.

251. Thus, the App Store competes in many markets for different types of transactions. In *Epic v. Apple*, I focused on the particular product that Apple provides to Epic, digital game transactions, and determined that the appropriate market for that matter was the market for digital game transactions.<sup>434</sup> However, this is just one of potentially multiple markets in which the App Store provides transactions to proposed developer and consumer class members. While I do not attempt to define all of the many markets in which the App Store provides transactions, I define a second market, the TV and video streaming app transaction market, as an example of an additional market to highlight how it is incorrect to cluster transactions for different types of apps into a single market.

#### *7.2.1. Example market #1: Digital game transactions*

252. I present empirical analyses and research that demonstrate that digital game transaction platforms provide services that are strong substitutes, both for the same game and across games, from the perspective of both developers and consumers of games in Appendix D.1. Thus, the digital game transaction market I defined in *Epic v. Apple* included other transaction platforms beyond the App Store.

253. Game developers that use the App Store for digital game transactions can choose to do so through many different platforms on many types of devices, including platforms for mobile devices (e.g., Google Play, the Samsung Galaxy Store, and the Amazon Appstore), for Windows PCs and Macs (e.g., the Mac App Store, Steam, GOG.com, Epic Games Store, and Microsoft Store for PC), and for consoles (e.g., PlayStation Store, Nintendo eShop, and Microsoft Store for Xbox). Among the many game transaction platforms, developers often offer the same game on different platforms. In fact, many developers make game transactions for the same game across several game transaction platforms simultaneously. In addition, game developers also substitute across game transaction platforms by choosing to offer certain games on some platforms while offering other games on other platforms.<sup>435</sup>

254. Developers also substitute across game transaction platforms in part by making decisions about whether, when, and how much to invest in a given game for a particular transaction platform. As I discuss in Appendix D.1.3, evidence shows that developers consider the relative benefits of different game transaction platforms and evaluate game transaction platforms along multiple dimensions when choosing the platform on which to develop and release their games.

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<sup>434</sup> Hitt *Epic* report, ¶ 127.

<sup>435</sup> See Appendix D.1.1 and D.1.2.



255. Game developers also have meaningful design choices available to them that impact where and how consumers will pay them for their games, i.e., make game transactions. For example, developers can enable customers to use the digital products or in-game currency they purchase through these alternative platforms on their iOS devices. Game developers can also link in-game content and game progression across a user's devices through a common user account (or "single sign-on"). Thus, game developers can enable customers to use digital products or in-game currency purchased on one game transaction platform on devices served by other game transaction platforms, including iOS devices.<sup>436</sup>

256. The fact that developers have so many options to offer game transactions to consumers is mirrored by the fact that consumers have many options available to make digital game transactions. Consumers use, own, or have access to multiple devices on which game developers offer games, thus allowing consumers to make game transactions on different platforms based on these devices. In addition, consumers make game transactions across multiple devices and through different game transaction platforms, which means they are able to substitute across these transaction platforms.<sup>437</sup>

257. Data from Epic's Fortnite game indicate that individuals substitute between game transactions for the same game on different game transaction platforms. These data show that Epic's customers play Fortnite on multiple devices and make transactions through multiple game transaction platforms. The data also show that even the specific subset of users who accessed Fortnite on iOS spent the vast majority of their time and money with regard to Fortnite on non-iOS devices, providing direct evidence that these iOS users have and use substitutes to the App Store for making game transactions.<sup>438</sup>

258. Finally, real world examples show that game transactions on the App Store are substitutes, rather than complements, for game transactions on other game transaction platforms.<sup>439</sup> In part this is because many types of transactions are strict technical substitutes – purchases of in-game currency on an iOS device are the same as a purchase of in-game currency on, say, a Sony PlayStation and can be used across devices. In addition, three examples show that consumers substitute between different game transaction platforms:

- Analysis of iOS device users who downloaded a free companion app for console or PC game transaction platforms (which serves as a proxy for using a game console or

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<sup>436</sup> See Appendix D.1.4.

<sup>437</sup> See Appendix D.1.6.

<sup>438</sup> See Appendix D.1.8.

<sup>439</sup> See Appendix D.1.9.

playing games on a PC) shows that consumers spend relatively less on iOS games as a result.<sup>440</sup>

- Analysis of the launch of Fortnite on the Nintendo Switch shows that users that started playing the game on the Nintendo Switch shifted their playtime and spending away from iOS relative to Fortnite users that did not start playing the game on the Nintendo Switch.<sup>441</sup>
- Analysis of the removal of Fortnite from the App Store shows that iOS users switched a significant amount of spending on Fortnite through the App Store to other non-iOS, non-Google platforms after Fortnite was removed from the App Store.<sup>442</sup>

259. Overall, these analyses indicate that game developers and game consumers have choices on where to perform game transactions. Developers and consumers treat these options as substitutes, which indicates that different transaction platforms compete with the App Store for game transactions. Thus, there is a well-defined games transaction market and that Apple already faces competition for games transactions with other platforms.

#### *7.2.2. Example market #2: TV and video streaming app transactions*

260. I present empirical evidence that shows that developers and their customers can and do make TV and video streaming app transactions (“video streaming app transactions”) through video streaming app transaction platforms other than the App Store and on non-iOS devices in Appendix D.2 I conclude that there is a well-defined video streaming app transaction market that includes other transaction platforms beyond the App Store.

261. While video streaming apps are typically listed under the Entertainment app genre in the App Store, not all Entertainment apps are video streaming apps. While I do not attempt to identify all video streaming apps that participate in the video streaming app transaction market, I identify and analyze 20 top video streaming apps based on the top apps by downloads and revenues through the App Store. The evidence shows that video streaming apps such as the ones I identify compete with each other.<sup>443</sup>

262. Video streaming app developers and consumers successfully use a variety of alternative transaction platforms to conduct video streaming app download transactions, thus allowing consumers to download and use video streaming apps on many types of devices. These

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<sup>440</sup> See Appendix D.1.9.1.

<sup>441</sup> See Appendix D.1.9.2.

<sup>442</sup> See Appendix D.1.9.3.

<sup>443</sup> See Appendix D.2.1.

devices include mobile devices, personal computers, some game consoles, media player devices (e.g. Roku), and smart TVs. In addition, developers can offer video streaming directly through a website. On the consumer side, consumers typically own multiple devices that support video streaming app transactions.<sup>444</sup>

263. Video streaming app developers generally monetize video streaming app transactions through subscriptions and they make paid subscription transactions with consumers through a variety of video streaming app transaction platforms as well as directly through web browsers. Customers also typically have a device-independent account that enables purchases and content consumption (including saving content to watch in the future and remembering where the consumer was in a particular movie or TV show) to transfer between devices. This allows consumers to substitute between platforms and devices for making video streaming app transactions. In addition, Apple's reader rule allows developers of video streaming apps to make transactions outside of iOS video streaming apps for content that can be consumed within the iOS video streaming app, while offering no paid transactions within the iOS app. This is different than the policies that generally apply to games, where content offered on other platforms must be offered for purchase in the iOS app (although the developer is free to set the price on different platforms at any level it chooses).<sup>445</sup>

264. The real-world example of Netflix shows that video streaming app transactions across app transaction platforms are substitutes, not complements. In December 2018, Netflix chose to no longer allow any paid transactions through the App Store, entirely removing the possibility of new customers signing up for Netflix's service within the iOS app. However, analysis shows that Netflix successfully substituted new subscription purchase transactions from the App Store to its web site or other video streaming app transaction platforms, showing how other subscription transactions outside of the App Store are substitutes for subscription transactions through the App Store for developers and consumers of video streaming apps.<sup>446</sup>

265. Finally, video streaming app developers can participate in Apple's Video Partner Program, which allows developers to pay a 15 percent commission rate on all download and in-app purchase transactions through the App Store.<sup>447</sup>

266. Overall, these analyses indicate that there is a well-defined market for video streaming app transactions and that developers and consumers can, and do, substitute between

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<sup>444</sup> See Appendix D.2.2.

<sup>445</sup> See Appendix D.2.3.

<sup>446</sup> See Appendix D.2.4.

<sup>447</sup> See Appendix D.2.5.

transactions on the App Store with transactions on other app transaction platforms and with direct distribution by developers.

*7.2.3. The market for digital game transactions and the market for video stream app transactions highlight the flaws in Plaintiffs' experts' market definition*

267. My analyses of the market for digital game transactions and the market for video streaming app transactions demonstrate that is fundamentally flawed to assume, as Plaintiffs' experts do, that there is a single market that combines all transactions for iOS apps.

268. As I explain in more detail in Appendix D.3, my analyses highlight many differences between these two markets:

- Video streaming apps are subject to different App Store rules and policies, such as the reader rule and the Video Partner Program, which do not apply to game apps.
- The available substitutes for video streaming app transactions differs from the substitutes for game transactions. In particular, video streaming apps can be used on devices such as media players (e.g., Roku TV and Fire TV) and smart TVs while games cannot.
- Game developers typically monetize apps through non-subscription in-app purchases while video streaming developers monetize apps through subscription in-app purchases.

269. Hence, the market for digital game transactions and the market for video streaming apps are distinct and cannot be combined into a single market.

***7.3. Plaintiffs' experts incorrectly conclude that Apple has market power based on an alleged profit margin for the App Store***

270. In addition to incorrectly concluding that the App Store competes in a single market for all app transactions that is limited to iOS apps, Plaintiffs' experts also incorrectly conclude that Apple has monopoly power in this alleged market.<sup>448</sup> Their conclusions regarding Apple's market power focus in large part on assertions that Apple's supposed App Store profit margin is "high" relative to purported benchmark profit margins earned by other companies.<sup>449</sup> However, the analysis of the App Store's alleged profit margin does not

<sup>448</sup> McFadden Report, ¶ 108; Elhauge Report, ¶ 181.

<sup>449</sup> McFadden Report, ¶ 116; Economides Report, Section II.B.1; Elhauge Report, ¶ 4.C.b ("Apple's extraordinarily high profit margins provide direct evidence that, as a near-100% monopolist, Apple has exercised a power to raise prices far more than 5% above competitive levels.").

support a conclusion that Apple has market power or monopoly power in the Plaintiffs’ alleged iOS app distribution markets or any other market.

271. Professor McFadden, Professor Elhauge, and Professor Economides all analyze Apple’s alleged App Store profit margin to conclude that Apple has market power and can charge what they deem an anti-competitive commission rate. All three cite to Apple documents which they claim can be used to calculate the profit margin specifically for the App Store.<sup>450</sup> Professor Economides also cites an internal financial planning document from Apple that he states shows that the App Store is more profitable than other technology firms as well as other “Apple services subcategories.”<sup>451</sup> He also compares the alleged profit margin for the App Store to five benchmark companies based on analysis performed by the developer plaintiffs’ accountant expert, Mr. Christian Tregillis.<sup>452</sup> Based on these documents and comparisons, all three experts conclude that Apple earns outsized profits from the App Store, which they interpret as evidence that Apple has market power and the ability to charge a supracompetitive commission rate.

272. Plaintiffs’ experts’ conclusions based on Apple’s supposed profit margins are fundamentally flawed. As Professor Schmalensee discusses, accounting profit margins do not provide insight into whether a firm has market power.<sup>453</sup> Plaintiffs’ experts’ flawed analysis of Apple’s alleged profit margin for the App Store cannot substitute for analysis of market outcomes, such as analysis of quantity, prices, and quality, that are typically used to determine whether a firm has market power. I performed such analyses of Apple’s market power previously in *Epic v. Apple* for the digital game transaction market as well as for Epic’s incorrectly defined iOS app distribution market, and I concluded that Apple does not have market power in either market.<sup>454</sup> I present a summary of those analyses in Appendix E. To assess whether Apple has market power, those same types of fact-intensive analyses would need to be performed for the other app transaction markets in which Apple competes—each offering different competitive conditions and competitive options for developers and consumers to transact, including options that would allow a developer to avoid paying Apple’s commission. The Plaintiffs have offered no such analysis. To perform such an analysis, would, as I described above, rely on developing facts that are not common across the proposed class of developers and consumers. In other words, to answer the

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<sup>450</sup> McFadden Report, ¶¶ 40, 117–122; Elhauge Report, ¶¶ 202–205; Economides Report, ¶¶ 19–20.

<sup>451</sup> Economides Report, ¶ 23. Professor Elhauge also compares his supposed App Store profit margin to a supposed profit margin for Google Play. See Elhauge Report, ¶ 213.

<sup>452</sup> Economides Report, ¶¶ 43–46.

<sup>453</sup> Schmalensee Report, Section IV.B.1.b.

<sup>454</sup> Hitt *Epic* report, Sections 4.3 and 4.4.

question of whether Apple has market power is a factual endeavor that relies on individual inquiries for transactions between different types of developers and consumers.

273. Moreover, Plaintiffs' experts' calculation of an alleged App Store profit margin is flawed because it implicitly assumes that the App Store can operate separately from the iOS ecosystem. It cannot. As testified to by multiple Apple employees, Apple runs an integrated business in which the App Store is one of many interconnected pieces.<sup>455</sup> As an integrated business, Apple does not view the App Store as a discrete business unit, and does not attempt to create a separate income statement for the App Store that reflects a fully burdened operating margin which would include allocations of all costs attributable to operating the App Store (e.g., R&D and other corporate overhead).<sup>456</sup> For example, Mark Rollins, a

<sup>455</sup> Deposition of Eddy Cue (Apple), February 8, 2021, pp. 74–75 (“Q What did you mean by ‘ecosystem’ as you were using it in those two sentences? A Again, we don't just sell devices. We sell other things. We sell other -- other devices from what you have. We sell accessories. We sell apps. We sell books. We sell videos. So those are all part of the ecosystem. Q And is one of the hopes that the ecosystem will work together as an integrated whole? A I don't -- I don't think it was a hope. I mean, we designed our products and we built our products in a way that was, I think, very revolutionary at the time and even today where you could have multiple products and not have any issues with compatibility or having to buy things multiple times or, you know, you create a document in one place, it's available in another place. So we've always been striving to make it very, very easy to -- for the customer to buy our products and have them work really seamlessly together. And I don't think anybody does that as well as us.”); and Deposition of Timothy Cook (Apple), February 12, 2021, pp. 71–72 (“Q. Do you recognize the term ‘iOS ecosystem’ as a term that you use? A. Yes. Q. What is the iOS ecosystem? A. It's all of the software and hardware that you can use with iOS devices, sort of the -- developers would be a part of ecosystem, a very important part of the ecosystem, obviously... Q. And does having them work together strengthen the iOS ecosystem? ... THE WITNESS: It increases customer satisfaction is the way I think about it and not only of iOS, but of the other product.”). See also Deposition of Matthew Fischer (Apple), Volume II, January 7, 2021, p. 244 (“Q Is there a way that you within Apple think of those three devices together, the iPhone, the iPad, and -- all of those devices, the iPhone, the iPad, the Watch and the TV?... THE WITNESS: I think we think of our products as an ecosystem, and as a combination of hardware, which were some of the products that you mentioned, the software that powers those products like iOS, iPadOS, macOS, watchOS, tvOS, and then the services that provide our customers with great experiences, one of those being the App Store.”).

<sup>456</sup> Deposition of Mark Rollins (Apple), February 11, 2021, pp. 78, 83 (“Q Have you -- my question for you, sir, is are you aware of an app store P&L that has been generated in the course of Apple's business that is more fully burdened than the estimates provided in the presentations to executives with authority over the app store?... THE WITNESS: So I would point you to, for example, the iTunes P&L as well as the line of business reports, the services line of business reports. The way that Apple thinks about it is more at a higher level where Apple -- Apple isn't structured, for example, in a business unit function. Apple is structured in a functional unit. And so as a result of that, as part of Apple's, you know, general philosophy that the purpose of Apple's products and services is really part of an ecosystem... Q... Mr. Rollins, have you seen a P&L estimate specific to the app store that is what you characterize as a fully burdened P&L for the app store? A I have not seen specifically a P&L for the app store that would be fully burdened with all the costs because that's not the way that Apple views its services. That's the way -- our system is not even set up that way in order to extract out those costs.”). See also Deposition of Philip Schiller, Volume I, February 11, 2021, pp. 252–253 (“Q. Are you aware of any attempt by Apple to allocate the costs to the App Store in the ordinary course of Apple's business since 2008 when the App Store was first introduced? A. I am not aware of an effort to do allocations of costs, allocations of specific financial methodology, and it's one that I'm not in the finance team at Apple. But I've heard many times it said at Apple that is not something that we want to get into doing is cost allocations. So I'm -- I have no[t] seen that. I don't recall seeing that, and it doesn't make sense at Apple that we would do something with an allocation model like that. Q. When you say you have never heard anyone say that you want to do a cost allocation, was that specifically in connection with the App Store that you said that? A. No. That's across everything at Apple. I recall in past conversations through the years, other companies do allocation models. And as I understand it, and I'm not a finance person, the idea of an allocation is a chargeback model. I spent 50 percent of my time on this project, and I charged it to your department, and you spent 50 percent and you charge it to my department, and this internal allocation accounting. And that's something that we've tried to stay away from in general at Apple because we don't think it's a very productive way to work as a company, and it's not something we do.”).



Finance Manager at Apple, testified that Apple does not operate in a business unit structure; instead, Apple is structured in “a functional unit” approach consistent with Apple’s ecosystem philosophy.<sup>457</sup> This integrated business approach is consistent with the compensation of App Store executives, which is not dependent on profitability measures associated with the App Store.<sup>458</sup> Moreover, Philip Schiller testified that “it doesn’t make sense at Apple” to allocate costs to particular services or products such as the App Store, and that such an allocation model is “something that we’ve tried to stay away from in general at Apple ... and it’s not something we do.”<sup>459</sup>

274. I understand that Professor Schmalensee and Mr. Malackowski also address other flaws with Plaintiffs’ experts’ profit margin calculations.<sup>460</sup>

## **8. INDIVIDUAL INQUIRY IS NECESSARY TO DETERMINE IF INDIVIDUAL DEVELOPERS AND CONSUMERS IN THE PROPOSED CLASSES WERE HARMED BY APPLE’S CHALLENGED CONDUCT**

275. Even if but-for commission rates were lower on some potential iOS app transaction platforms compared to the actual world, or if some developers transacted directly with consumers, that would not mean that all proposed developer class members or all proposed consumer class members were harmed by Apple’s challenged conduct. To the contrary, individual inquiry would be required to determine whether Apple’s challenged conduct led to reduced profits for any individual developer in the proposed developer class. Similarly,

<sup>457</sup> Deposition of Mark Rollins (Apple), February 11, 2021, pp. 78:13–79:9 (“Apple isn’t structured, for example, in a business unit function. Apple is structured in a functional unit. And so as a result of that, as part of Apple’s, you know, general philosophy that the purpose of Apple’s products and services is really part of an ecosystem. ... And so as a result of Apple not being structured as a business unit, for example, that’s frankly one of the reasons why our system isn’t structured that way is that you could just push a button and pop out, for example, an App Store P&L.”).

<sup>458</sup> Deposition of Philip Schiller (Apple), Volume II, February 15, 2021 pp. 443:18–444:2 (“Q. Mr. Schiller, has your compensation ever been based in part on the profitability of the App Store? A. I don’t believe I have ever had any -- any compensation based on App Store profitability, no. Q. What about any sort of stock benefits given to you on the basis of App Store profitability? A. Again, I have never heard of any stock benefits being based on App Store profitability.”).

<sup>459</sup> Deposition of Philip Schiller, Volume I, February 11, 2021, pp. 252:20–253:25 (“Q. Are you aware of any attempt by Apple to allocate the costs to the App Store in the ordinary course of Apple’s business since 2008 when the App Store was first introduced? A. I am not aware of an effort to do allocations of costs, allocations of specific financial methodology, and it’s one that I’m not in the finance team at Apple. But I’ve heard many times it said at Apple that is not something that we want to get into doing is cost allocations. So I’m -- I have no[t] seen that. I don’t recall seeing that, and it doesn’t make sense at Apple that we would do something with an allocation model like that. Q. When you say you have never heard anyone say that you want to do a cost allocation, was that specifically in connection with the App Store that you said that? A. No. That’s across everything at Apple. I recall in past conversations through the years, other companies do allocation models. And as I understand it, and I’m not a finance person, the idea of an allocation is a chargeback model. I spent 50 percent of my time on this project, and I charged it to your department, and you spent 50 percent and you charge it to my department, and this internal allocation accounting. And that’s something that we’ve tried to stay away from in general at Apple because we don’t think it’s a very productive way to work as a company, and it’s not something we do.”).

<sup>460</sup> Schmalensee Report, Section IV.B.1.b; Malackowski Report, Section 11. I note that Apple’s overall gross margin in FY2020 was 38 percent. See Apple Inc., Form 10-K for fiscal year ended September 26, 2020, filed on October 30, 2020, p. 23.



individual inquiry will be required to determine whether Apple's challenged conduct led to increased prices on net for any individual consumer in the proposed consumer class.<sup>461</sup>

276. In particular, it is necessary to evaluate several factors that would affect whether any individual proposed developer class member received lower profits, and if so, by how much, due to Apple's challenged conduct. While this is not an exhaustive list, it would at least be necessary to:

- Establish the but-for business models and commission rates for the App Store and for other iOS app transaction platforms.<sup>462</sup>
- Establish whether the developer would transact through the App Store, through alternative iOS app transaction platform(s), or directly with the consumer in order to assess the but-for commission rate that applies to that developer's transactions.
- Determine whether the but-for commission rate the developer would pay on the App Store or an alternative iOS app transaction platform, or the cost of direct distribution, would be lower than the commission the developer paid to Apple in the actual world.
- Consider other fees that Apple or other iOS app transaction platform operators would charge in the but-for world and whether these fees would be higher or lower for the developer compared to the actual world. In particular, it would be necessary to consider whether services that are free in the actual world would continue to be free in the but-for world, such as the ability to transact free apps and to monetize such apps without paying anything to the App Store.
- Determine whether the prices the developer charges consumers would change in the but-for world. For instance, it is necessary to determine whether a developer would pass-through, either entirely or in part, any difference in the commission rate or other fees or costs in the but-for world and how such pass-through, if any, would impact the developer's profits. Similarly, it is necessary to determine whether the developer might alter its pricing strategy overall, such as charging for what were formerly free apps, or changing the mix of payment among initial downloads, in-app purchases, subscriptions purchased outside the App Store, and other forms of monetization, such as in-app advertising, that do not incur a commission.
- Determine whether potential changes in competition between apps in the but-for world would impact the developer's profits.

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<sup>461</sup> While Professor Elhauge claim that there may be consumer harm due to reduced quality or choice of apps, they have not offered any class-wide evidence of this fact, nor have they shown that the claimed decline in quality or choice of apps would lead to harm for all consumers or all types of apps. Elhauge Report, ¶ 21 ("I also explain that anticompetitively inflating the commission Apple charged developers also harmed consumers by reducing the quantity and quality of iOS apps and in-app content.")

<sup>462</sup> I discussed in Section 6 why Plaintiffs' experts' claims about but-for commission rates are fundamentally flawed and unreliable.

- Determine whether changes in the quality, security, or privacy on the iOS ecosystem or whether potential changes in innovations to the iOS ecosystem provided by Apple would impact the developer's profits.

277. Similarly, it is necessary to evaluate several factors that would affect whether any individual proposed consumer class member paid higher prices overall and, if so, by how much, due to Apple's challenged conduct. While this is not an exhaustive list, it would at least be necessary to:

- Establish the but-for business models and commission rates for the App Store and for other iOS app transaction platforms.<sup>463</sup>
- Establish whether the consumer would transact through the App Store, through an alternative iOS app transaction platform, or directly with developers. If a consumer would transact through more than one transaction platform, it would be necessary to also establish the process by which the consumer selects a particular transaction platform for a particular app.
- Determine whether the costs to the developer of transacting with the consumer (including the commission rate, other fees, or the cost of direct distribution) would be lower than the cost to the developer of transacting on the App Store in the actual world.
- Determine whether the consumer would pay a lower price if the developer's costs of transacting in the but-for world were lower (i.e., whether the developer reduces the price to consumers in response to a lower commission rates). Such an analysis is further complicated by the ability of the developer to change their mix of monetization approaches among initial downloads, in-app purchases, subscriptions purchased outside the App Store, or other forms of monetization such as in-app advertising, that do not incur a commission.
- Determine whether the consumer would pay a lower price due to potential changes in competition between apps in the but-for world.
- Determine whether changes in the quality, security, or privacy on the iOS ecosystem or whether potential changes in innovations to the iOS ecosystem provided by Apple would impact the consumer.
- Review all of the consumer's transactions to determine whether the consumer paid higher prices on net across all transactions.

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<sup>463</sup> I discussed in Section 6 why Plaintiffs' experts' claims about but-for commission rates are fundamentally flawed and unreliable.

278. Other than but-for commission rates, which I discussed in Section 6, Plaintiffs' experts have failed to evaluate or offer methods to assess nearly all of these factors in concluding that all proposed developer class members and nearly all proposed consumer class members have been impacted by Apple's challenged conduct. Thus, they have not provided a common method or a set of facts that would allow one to analyze these factors or determine if an individual developer or consumer in the proposed classes has been impacted by Apple's challenged conduct.

279. Instead, Plaintiffs have dramatically simplified the situation faced by proposed developer and consumer class members. For instance, Professor Economides simply assumes that a uniform reduced commission rate will exist and will entirely benefit developers, who will not decrease their prices to consumers. He also bases his calculations on an assumption that there are no other changes in any aspect of the market.<sup>464</sup> Professor Elhauge also only considers the effect of Apple's alleged conduct on commissions.<sup>465</sup>

280. Professor McFadden, on the other hand, examines how a constant change in commission would be divided between developers and consumers using a model of consumer demand.<sup>466</sup> However, as discussed by Professor Prince, Professor McFadden's demand model makes unrealistic assumptions throughout.<sup>467</sup> Some of the critical and incorrect or unrealistic assumptions include a single commission rate for all transactions, a common price sensitivity within a genre (i.e., games) or group of genres (i.e., media and entertainment), and a complete absence of competition among apps (e.g. he assumes that Spotify does not compete against Pandora).<sup>468</sup> In reality, the analysis of all of these factors will depend on the

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<sup>464</sup> Economides Report, ¶ 64 ("I am calculating damages assuming that prices in the but-for world are the same as now, knowing that if in fact prices were lower in the but for world, damages would be higher than the amount I calculated. Thus, I am calculating damages in a conservative, defendant-friendly way."). See also, for example, Economides Report, ¶ 70 ("To be conservative, I assume that, in the but for world, competition from other distribution methods would not reduce Apple's pricing of its Developer Program, and moreover that developers using other distribution channels would nevertheless value the tools, SDK, and testing provided through the program and would continue to pay the \$99 annually."); Economides Deposition, p. 241 ("Q. ... You agree that you calculate damages assuming that developers would not change their prices, correct? ... THE DEPONENT: Yes. Q. ... And are you testifying now that you believe that assumption is 100 percent accurate as a factual matter? ... THE DEPONENT: Well, I already explained why I think it's a -- it's a very, very, very reasonable assumption.").

<sup>465</sup> Professor Elhauge's assignment is specific to commissions only. See Elhauge Report, ¶2 ("Can common economic evidence establish whether Apple's challenged conduct reduced competition and thereby caused the developer class to pay supracompetitive commissions?")

<sup>466</sup> In other words, Professor McFadden attempts to determine how lower commission rates would be passed-through to app prices. See McFadden Report, ¶163 ("The second step of my methodologies for quantifying the common economic impact of Apple's anticompetitive conduct is to calibrate the app and in-app content prices that would have prevailed at the But-For commission rates.").

<sup>467</sup> Prince Report, Section 4.1.

<sup>468</sup> Prince Report, ¶¶ 11, 14, and 15. See also, e.g., McFadden Report, ¶ 161 ("I use 10-12 percent as the But-For commission rates."); and ¶ 211 ("This modification allows the estimated model to reflect the demand and supply conditions that are specific to each app category. For example, iOS device consumers who purchased apps belonging to

specific characteristics of the but-for world. In addition, analysis of these factors would require individual inquiry for each app.

281. In this section, I discuss several of these factors in greater detail to demonstrate why they are necessary to consider in order to determine impact and damages, how Plaintiffs' experts have not provided a method to address these factors, and why as a result, individual inquiry is required to determine impact and damages.

***8.1. Plaintiffs' experts have failed to specify how potential iOS app transaction platforms, or direct distribution, would compete for developers and consumers and thus cannot identify which proposed class members, if any, would transact outside of the App Store or at reduced commission rates***

282. As I discussed in Section 6.4, Apple would likely charge in the but-for world the same 30 percent commission rate (plus a 15 percent commission rate for certain transactions) that it charges in the actual world. In addition, many potential iOS app transaction platforms are likely to charge a 30 percent commission rate for many transactions in the but-for world while possibly charging lower rates for certain transactions, potentially on an individually negotiated basis.

283. A key question, then, to determine whether an individual consumer or developer in the proposed classes is harmed and, if so, the amount of harm, is whether the class member would make at least some transactions on an alternative iOS app transaction platform that charges a lower commission rate or would transact directly at a lower cost. However, Professor Economides, Professor Elhauge, and Professor McFadden do not attempt to answer this question.

284. In fact, none of Plaintiffs' experts attempt to model entry of alternative transaction platforms or the decision by developers to distribute directly to consumers.

- Professor Economides does not model app transaction platform competition. In his profit yardstick method he simply assumes a rate of entry (e.g., he claims one or two alternative iOS app transaction platforms would enter) and assigns each entrant an arbitrary share of the alleged market. Specifically, he assumes that the alternative iOS app transaction platform in his one-entrant scenario would achieve a 35 percent market share and just assumes that each of the two alternative iOS app transaction

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the Games category may have a different degree of price sensitivity, on average, from those who purchased apps belonging to the Music category.”).

platforms in his two-entrant scenario would achieve a 25 percent market share.<sup>469</sup> He performs no empirical analysis to justify these assertions, thus they are no more justified than any other number of entrants or range of market shares.<sup>470</sup>

- Professor Economides' commission yardstick method is silent on entry of other iOS app transaction platforms (or direct distribution) in the but-for world and does not specify whether *any* other iOS app transaction platforms would enter in this method.
- Professor Elhauge outlines a number of firms that he claims "were well-positioned to enter the iOS app distribution market but for Apple's conduct."<sup>471</sup> In addition, he claims that "[i]n markets that are similar to the iOS app distribution market, but are not distorted by similar exclusionary conduct, there are typically numerous app distributors and a significant amount of self-distribution."<sup>472</sup> However, he does not model entry, or model the use of direct distribution in his but-for world.
- Professor McFadden is similarly silent on entry of other iOS app transaction platforms (or direct distribution) in the but-for world and likewise does not specify whether *any* other iOS app transaction platforms would enter in his model.

285. Likewise, none of Plaintiffs' experts effectively models how potential iOS app transaction platforms would compete with each other, with direct distribution, and with the App Store in the but-for world. Instead, as I discussed in Section 6, Plaintiffs' experts either (i) implicitly assume (contrary to market facts) that all alternative iOS app transaction platforms in the but-for world are undifferentiated and that all would charge the same (low) commission rates (regardless of whether they offer the same quality),<sup>473</sup> or (ii) assume that alternative iOS app transaction platforms in the but-for world are differentiated, but that (contrary to market facts) all would charge commissions below Apple's actual world

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<sup>469</sup> Economides Report, ¶ 48 ("Therefore, 35% is the single entrant market share that is currently best supported by the evidence. ... [E]xtrapolating from the one-entrant scenario I assume market shares of 25% for each entrant in the two-entrant scenario."). I further discuss the validity of these assumptions in Section 6.2.1.6. Professor Economides stated in his deposition that he could not know which companies would launch iOS app transaction platforms in the but-for world. Economides Deposition, p. 47:3–9 ("Q. Okay. Is it your view that even in the light of economic logic and the evidence in the case, that there is no way to know which specific companies would have entered the iOS app distribution market by launching app stores, in the but-for world? A. That's correct, uh-huh, yes.").

<sup>470</sup> Economides Report, ¶¶ 47, 49. Professor Economides asserts there would be "a modest amount of entry" and that he would "not expect many firms in the market" due in part to the fact that app transaction platforms are two-sided platforms that rely on indirect network effects. However, he provides no actual justification for assuming one or two competing iOS app transaction platforms in the but-for world other than to say that such an assumption is "defendant-friendly." Of course, whether the entry of more iOS app transaction platforms reduces commissions depends on the nature of the competition between the App Store and the alternative platforms, which Professor Economides has not specified.

<sup>471</sup> Elhauge Report, ¶ 307.

<sup>472</sup> Elhauge Report, ¶ 313.

<sup>473</sup> Economides Report, Table 7; McFadden Report, ¶ 161 ("I use 10-12 percent as the But-For commission rates.").

commissions.<sup>474</sup> See the discussion in Section 6. However, the extent to which these entrants differ from the App Store in the but-for world is unexplained. In addition, developers have different business models and monetization strategies while consumers have different preferences and make different types of app transactions; thus, developers and consumers will make different choices about the platforms on which they would transact.

286. Plaintiffs' experts do not attempt to determine which developers and consumers would chose to transact on the App Store, as opposed to on potential alternative iOS app transaction platforms, or engage in direct distribution. However, determining whether a developer and consumer would transact outside of the App Store in order to obtain a potentially lower commission rate is necessary to determine whether an individual developer or consumer in the proposed classes is harmed. This is particularly true here, since, as I discussed in Section 6.4, evidence indicates that Apple would likely charge the same commission rates in the but-for world as it does in the actual world. Thus, Plaintiffs' experts have failed to provide a method to determine which developers and consumers, if any, are harmed, and individualized inquiry would be necessary to make such a determination.

287. In this section, I first show that app transaction platforms are differentiated along many dimensions, including price and quality. I also show that the ability of a developer to distribute an iOS app directly to consumers is costly and varies across developers. I further show that developers and consumers face different circumstances that would impact their willingness to transact on different app transaction platforms. I then show how, consistent with these facts, both developers and consumers make individualized choices about where to transact. This may include choosing to transact on an iOS app transaction platform with a higher commission rate rather than choosing another differentiated option with a lower commission rate. I conclude by showing that individualized inquiry is required to determine whether a particular proposed developer or consumer class member would transact outside the App Store in the but-for world.

#### *8.1.1. App transaction platforms are differentiated and charge different commission rates for some developers*

288. App transaction platforms are differentiated along a variety of dimensions. I previously showed in Section 5.5 that while most app transaction platforms charge a headline rate of 30 percent, deviations from this headline rate vary across app transaction platforms, representing

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<sup>474</sup> Elhauge Report, ¶¶ 324-328, 349, and footnote 528. In contrast, in his deposition, when asked whether in the but-for world Steam might open a rival iOS app store with a 30, 25, and 20 percent commission rate structure, Professor Elhauge was not sure and stated that he had not "reached a conclusion about Steam's but-for commission in the iOS app market." Elhauge Deposition, pp. 199:21-200:6.



just one way in which app transaction platforms are differentiated. For instance, as I discussed in Section 5.5.1, Google Play, the Amazon Appstore, and the Samsung Galaxy Store all offer specialized deals for individual developers or specific sets of developers, such as programs that offer in-kind credits for certain Google and Amazon services or individually negotiated commission rates as on the Amazon Appstore and the Samsung Galaxy Store. Other transaction platforms, like the Epic Games Store, offers individualized contract terms, including exclusive agreements and minimum guarantees with game developers.<sup>475</sup> Such individualized terms would likely be present on potential iOS app transaction platforms in the but-for world, leading to heterogeneity in where developers transact and the effective commission rate paid on each platform.

289. App transaction platforms may also differentiate themselves in terms of the types of apps offered. For example, while the Microsoft Store and the Mac App Store both offer transactions for a wide range of apps, other platforms such as Steam and the Epic Games Store focus on game app transactions.<sup>476</sup> GOG.com (an acronym for “Good Old Games”), on the other hand, initially focused on transactions for older, “retro” games but has more recently started also offering transactions for newer games, typically from independent developers.<sup>477</sup>

290. App transaction platforms are also differentiated in the services, features, and other quality attributes they offer. Professor Elhauge acknowledges this fact, stating that “there are at least three ways in which one would expect iOS app distributors to be vertically differentiated in the but-for world” and there is “variation in the strategies that app distributors use to attract customers and developers to their platforms.”<sup>478</sup>

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<sup>475</sup> See Section 5.5.2.5.

<sup>476</sup> The Microsoft Store has a total of 26 different app categories and 75 different app subcategories with categories ranging from games to productivity and lifestyle. For a full list of categories see Windows Developer “Category and Subcategory Table” available at <https://docs.microsoft.com/en-us/windows/uwp/publish/category-and-subcategory-table> accessed on July 28, 2021. Similarly, the Mac App Store is separated into 27 different categories where developers choose primary and secondary categories including gaming, news and medical. For a full list of categories see Apple Developer “Choosing a Category” available at <https://developer.apple.com/app-store/categories/>, accessed on July 28, 2021. The Epic Games Store was separated into categories of gaming apps exclusively until December 2020, when Spotify began offering its apps on the Epic Games Store. See Epic Games Store, “Official Site” available at <https://www.epicgames.com/store/en-US/browse>, accessed on July 28, 2021; Engadget, “Spotify is now available on the Epic Games Store,” December 17, 2020, available at <https://www.engadget.com/spotify-epic-games-store-183259781.html>, accessed on August 9, 2021. Likewise, Steam is separated into categories of exclusively gaming apps. See Steam “Games on Steam” available at <https://store.steampowered.com/games> accessed on July 28, 2021.

<sup>477</sup> Shaun Prescott, “The most popular desktop gaming clients, ranked,” *PCGamer*, July 5, 2019, available at <https://www.pcgamer.com/the-most-popular-desktop-gaming-clients-ranked/>, accessed on July 28, 2021

<sup>478</sup> Elhauge Report, ¶¶ 327–328.



291. One way that app transaction platforms are differentiated is, according to Professor Elhauge, “their ability to identify malicious apps.”<sup>479</sup> Market facts are consistent with this. For example, Steam includes a review process to approve developers and games to transact on its platform.<sup>480</sup> The Epic Games Store, while it does have a review process, recently added itch.io as a “store within a store” and thus relinquished the ability to review every game available through the Epic Games Store.<sup>481</sup> More broadly, different platforms differ in the depth and breadth of their app review process which influence the extent to which consumers are exposed to potentially malicious apps that would compromise device security or consumers’ privacy.<sup>482</sup> Dr. Rubin discusses at length the security protections provided by Apple for iOS relative to Android and other devices. He demonstrates that existing third-party app transaction platforms have lower security protections compared to the Apple App Store.<sup>483</sup>

292. Another dimension in which app transaction platforms differ is in their offerings regarding security. Steam allows for developers to apply their own digital rights management (“DRM”) solutions in order to avoid piracy and also provides its own limited DRM solution.<sup>484</sup> Meanwhile, GOG.com differentiates itself by focusing on offering “DRM free” games, meaning that the file can be copied, stored, and distributed by the end user.<sup>485</sup>

293. Lastly, app transaction platforms are differentiated in terms of the number of developers and consumers that transact on the platform. As Professor Schmalensee discusses in his report, two-sided platforms like app transaction platforms are characterized by indirect network effects such that more consumers on the platform benefits developers and vice

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<sup>479</sup> Elhauge Report, ¶ 327.

<sup>480</sup> Steamworks, “Review Process,” available at [https://partner.steamgames.com/doc/store/review\\_process](https://partner.steamgames.com/doc/store/review_process), accessed on August 3, 2021 (“Once you have completed your checklists, your store presence and product build will need to be reviewed by Valve before you can release your game or software. You’ll need to click ‘Mark as ready for review’ to communicate to Valve that you have completed the necessary work items and are ready for your store page and proposed pricing to be reviewed.”).

<sup>481</sup> Brendan Sinclair, “Epic Games Store adds Itch.io app,” GamesIndustry.biz, April 22, 2021, available at <https://www.gamesindustry.biz/articles/2021-04-22-epic-games-store-adds-itch-io-app>, accessed on August 3, 2021.

<sup>482</sup> Professor Elhauge agrees that variation in a platform’s ability to identify malicious app is a differentiating feature. See Elhauge Report, ¶ 327.

<sup>483</sup> Expert Report and Declaration of Aviel D. Rubin, Ph.D., August 10, 2021, Section VIII.

<sup>484</sup> Rick Lane, “What’s the State of DRM in 2020?” Rock Paper Shotgun, May 28, 2020, available at <https://www.rockpapershotgun.com/whats-the-state-of-drm-in-2020>, accessed on August 5, 2021. For a discussion of Digital Rights Management on PC devices, and Steam Games, see “Steam DRM,” available at <https://partner.steamgames.com/doc/features/drm>, accessed on August 3, 2021.

<sup>485</sup> GOG.com, “About GOG.com,” available at [https://www.gog.com/about\\_gog](https://www.gog.com/about_gog), accessed on August 3, 2021 (“A selection of great DRM-free games, from modern hits to all-time classics, that you really shouldn’t miss.”). Professor Elhauge also recognizes “cross-platform transferability of app purchase” as a source of differentiation between app transaction platforms. See Elhauge Report, ¶ 327.

versa.<sup>486</sup> Professor Elhauge also recognizes indirect network effects as a source of differentiation between platforms.<sup>487</sup> Thus, the presence of indirect network effects based on the number of developers, consumers, and apps on a particular app transaction platform further differentiates these platforms. For example, there are over 1 million developers offer over 3.4 million apps through Google Play.<sup>488</sup> On other hand, fewer developers offer apps on the Amazon Appstore: only 143,000 developers offer 694,000 apps through the Amazon Appstore.<sup>489</sup> In addition to network effects, platforms with more developers potentially provide consumers with greater choice while at the same time increasing potential competition among developers which could lead to greater innovation and perhaps lower prices.

*8.1.2. The cost of direct distribution will vary across developers in the but-for world*

294. Plaintiffs' experts assume that direct distribution of apps from developers to consumers would serve as an additional competitive constraint on the App Store in the but-for world.<sup>490</sup> In addition, Professor Economides relies on costs associated with direct distribution to calculate his "effective" average commission rate.<sup>491</sup>

295. Despite the importance of direct distribution to Plaintiffs' experts' but-for analyses, they provide no analyses to determine whether direct distribution is a viable option for most proposed developer class members. In particular, they have not analyzed the costs of direct distribution of iOS apps by developers and how these costs would vary by developer. In fact, rather than analyzing direct distribution costs across developers, Professor Economides makes the baseless and untenable assumption in his commission rate yardstick approach that

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<sup>486</sup> Schmalensee Report, Section VII.A.

<sup>487</sup> Elhauge Report, ¶ 327 ("[B]ecause app distribution platforms have significant indirect network effects (an app distribution platform is more useful to developers the more consumers are on the platform, and vice versa), iOS app distributors with larger developer and/or consumer networks would be more valuable to users and developers than smaller iOS app distributors.").

<sup>488</sup> 42Matters, "Google Play Statistics and Trends 2021," available at <https://42matters.com/google-play-statistics-and-trends>, accessed on August 8, 2021.

<sup>489</sup> 42Matters, "Amazon Appstore Statistics and Trends 2021," available at <https://42matters.com/amazon-appstore-statistics-and-trends>, accessed on August, 8, 2021.

<sup>490</sup> Economides Report, ¶ 38 ("[I]n the but-for world ... competition from self-distribution would either discipline the pricing of 3rd-party stores in the market, or developers would self-distribute in the but-for world."); Elhauge Report, ¶ 14 ("Apple would have faced significantly more competition from rival iOS app distributors and direct distribution of iOS apps but for its challenged conduct").

<sup>491</sup> Economides Report, ¶ 38 ("To calculate a yardstick, I and my staff have identified three different online PC app stores distributing 3<sup>rd</sup>-party apps, and five different online PC app stores self-distributing apps."). I discuss the flaws in Professor Economides' use of the costs of direct distribution in Section 6.2.1.5.

fixed costs and variable costs are identical across developers that operate storefronts in which they directly distribute their apps (sometimes alongside apps from third-party developers).<sup>492</sup>

296. In reality, costs of direct distribution vary across developers, and it is likely that direct distribution is not a viable option for many, if not most, proposed developer class members if there is any fixed cost. As shown in Figure 10, approximately [REDACTED] of the proposed developer class members had less than \$1,000 in total revenues during the class period, suggesting it would be unlikely they could incur any material fixed cost to distribute directly to consumers (and certainly not the [REDACTED] in fixed costs that Professor Economides assumes in his analysis). Even among developers who may have sufficient scale to consider direct distribution, developer costs for direct distribution will vary based on a variety of factors specific to each developer, such as customer acquisition costs, economies of scale, payment processing costs, whether the app requires significant server space and constant updates, and more. Professor McFadden acknowledges some of this variation: For example, he discusses how the game developer Pocket Gems has server costs averaging [REDACTED] of gross revenues, while recognizing that “servers are critical” in particular for multiplayer games.<sup>493</sup> User acquisition costs may be especially important when deciding on direct distribution. Professor McFadden finds that Epic Games faces a user acquisition cost equal to [REDACTED], while the app developer [REDACTED].<sup>494</sup> Whether a developer in the but-for world would have direct distribution costs more like Epic Games or more like Pocket Gems will depend on that developer’s specific situation. For these and other reasons, different developers will make different choices regarding whether to engage in direct distribute or to transact through an app transaction platform.

297. Professor Economides also discusses the “Humble Widget,” provided by HumbleBundle.com as a way for small developers to distribute directly to consumers.<sup>495</sup> He claims this widget is an option for direct distribution “even when the developer is extremely small and/or has no expertise in online distribution.”<sup>496</sup> However, as Professor Economides

<sup>492</sup> Economides Report, ¶ 38 (“For the stores self-distributing apps, I have estimated costs based on the costs incurred by the Epic Games Store. I estimate that their costs are equal to [REDACTED] per year plus [REDACTED], expressed together as a percentage of revenues.”). I discuss the flaws with this approach in more detail in Section 6.2.1.5.

<sup>493</sup> McFadden Report, ¶¶ 190 and 203.

<sup>494</sup> McFadden Report, ¶¶ 189 and 190.

<sup>495</sup> See HumbleBundle, “Humble Widget,” available at <https://www.humblebundle.com/developer/widget>, accessed on August 8, 2021.

<sup>496</sup> Economides Report, ¶15 (“Small developers such as Subset Games and Almost Human self-distribute their apps using Humble Widget combined with Steam keys.”); ¶29 (“For smaller developers, HumbleBundle.com offers a simple self-distribution solution (the Humble Widget) that includes hosting and download services, a “widget” that can be embedded in the developer’s existing website, and payment processing.”).

acknowledges, direct distribution through Humble Widget is often paired with the use of Steam Keys, which are key codes that developers who transact through Steam can provide to consumers so they can obtain the game through Steam. While developers that use Humble Bundle plus Steam Keys do not pay commissions to Steam for these downloads, Steam limits the use of these keys, does not allow the developer to distribute more keys than the number of units sold through Steam, and places other restrictions on developers in using these keys.<sup>497</sup> Thus, this option for direct distribution is limited, and Professor Economides has not provided evidence indicating that such a system would be a viable option for many (or any) small developers in the but-for world.

298. It follows that the claimed higher profits that would flow to a developer through choosing direct distribution will only be available to some proposed developer class members, and that the potential benefit of direct distribution will vary both across proposed developer class members and within proposed developer class members over time. Additionally, the competitive pressure for any app transaction platform to offer lower commissions to compete with direct distribution would only be relevant for transactions of certain developers depending on where developers of competing apps choose to distribute (and the relative costs and benefits of doing so). Thus, the option of direct distribution in the but-for world would not be expected to lead to higher profits for all developers nor lower prices for all consumers. To determine for whom it would be relevant requires analysis of individual facts that are not common across all developers or consumers.

*8.1.3. Plaintiffs have not established that many developers distribute directly to consumers rather than through an app transaction platform*

299. Although Plaintiffs' experts assert that direct distribution of iOS apps from developers to consumers would serve as a meaningful competitive constraint on the App Store, Plaintiffs' experts have not even demonstrated that a large number of developers can distribute directly or that consumers choose to transact directly with developers that do

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<sup>497</sup> Economides Report, footnote 25 ("Steam keys are key codes distributed by the Steam Store to developers who distribute games through Steam, that are redeemable by users to receive games through the Steam Store, equivalent to games purchased through normal means on Steam. These keys can be sold or distributed as free tests or promotions. Steam's key guidelines require that if developers sell these keys they not sell them for any less than they sell the corresponding game on Steam, and that developers not distribute more keys than they sell units of a game on Steam."). Professor Economides also acknowledged at his deposition that Humble Bundle was a "kind of hybrid" between direct distribution and transacting through an app transaction platform. See also Economides Deposition, pp. 64:2–65:2. See also, Steam Games, "Steam Keys," available at <https://partner.steamgames.com/doc/features/keys>, accessed on August 8, 2021.

distribute directly.<sup>498</sup> Thus, they have not provided evidence that any individual proposed developer or consumer class member would transact directly in the but-for world.

300. Plaintiffs' experts discuss a limited set of examples of developers that distribute directly to consumers. These examples are mostly large developers of PC games. For example, Professor Economides discusses large storefronts for the self-distribution of PC games by Activision Blizzard (with its store Battle.net), EA (with its storefront Origin), Valve (with its storefront Steam, which also offers third-party games), Epic (with its storefront Epic Games Store, which also offers third-party games), and Tencent (with its storefront WeGame).<sup>499</sup> This is not representative of all PC app developers, much less representative of developers that transact through the App Store in the real world. For instance, according to Professor Economides' Table 4, every one of these direct distribution storefronts had at least [REDACTED] in sales from direct distribution in 2019. In contrast, as I showed in Figure 10, [REDACTED] of proposed developer class members had less than [REDACTED] in total sales through the App Store over the whole class period.

301. Beyond these examples, Plaintiffs' experts have not analyzed whether most, or even many, developers of apps for a particular device choose to distribute those apps directly to consumers when given the option. In fact, Professor Economides acknowledged at his deposition that he couldn't know whether a specific developer would engage in direct distribution in the but-for world.<sup>500</sup> The evidence shows that only certain developers distribute apps directly to consumers and that many app developers do not engage in direct distribution.

302. For instance, Netflix distributes its Android app directly to consumers with Android devices.<sup>501</sup> In addition, Netflix allows consumers to stream Netflix content directly through a

<sup>498</sup> Economides Report, ¶ 38 (“[I]n the but-for world ... competition from self-distribution would either discipline the pricing of 3<sup>rd</sup>-party stores in the market, or developers would self-distribute in the but-for world.”); Elhauge Report, ¶ 90 (“However, when app distribution is more competitive, as with the distribution of Windows or macOS apps, many developers self-distribute, supporting the likelihood that iOS developers could feasibly do the same in the but-for world.”); ¶ 346 (“In the but-for world, Apple would face increased competition for *every* developer. *Every* developer would have the option of self-distributing their apps.”) (emphasis in original).

<sup>499</sup> Economides Report, Table 4. Professor Elhauge also discusses two examples of apps, Piezo and Dash, which stopped transacting through the Mac App Store. Professor Elhauge asserts that these are examples of apps that successfully shifted to direct distribution, accounting for “near 100%” demand shifting. Both apps, however, already had direct distribution in place at the time they chose to stop transacting through the Mac App Store. Whether or not demand would shift when choosing direct distribution is entirely different to whether or not an individual developer would find it profitable to start doing so in a but-for world. Moreover, it is already possible for developers to make transactions outside of the App Store for content that consumers can use within an iOS app. See Elhauge Report, ¶¶ 95-97.

<sup>500</sup> Economides Deposition, p. 47:10–14 (“Q. Okay. And you agree that there is no way to know which specific companies would have entered the iOS app distribution market by self-distributing apps in the but-for world? A. Yes...”).

<sup>501</sup> Netflix, “Can’t find the Netflix app in app stores,” available at <https://help.netflix.com/en/node/12983>, accessed on July 28, 2021.

web browser on a computer and purchase subscriptions on a web browser that can be used on any compatible device.<sup>502</sup> On the other hand, while Netflix allows consumers with certain Windows computers to download a Netflix app for PC from the Microsoft Store, Netflix does not allow consumers to download a Netflix app for PC directly from the Netflix website.<sup>503</sup> Another example is the game Minecraft. With over 200 million downloads, Minecraft is available on the Google Play Store and the Amazon Appstore, but it is not available on the Samsung Galaxy Store.<sup>504</sup> Similarly, Roblox is available on both the Google Play Store and the Amazon Appstore but is not available on the Samsung Galaxy Store. For PC, it is also only available on the Microsoft Store or through the Roblox web site.<sup>505</sup>

303. Many of the largest developers do not choose to distribute directly. For example, Supercell, developer of Clash of Clans, is among the top ten game developers on Google Play.<sup>506</sup> However, Clash of Clans—Supercell’s top game on Google Play—does not appear to be available via direct distribution based on the Supercell website.<sup>507</sup> Other top game developers on Google Play who do not offer their top games via direct distribution for Android devices include Playrix (Homescapes), Niantic (Pokémon Go), and Moon Active (Coin Master).<sup>508</sup> Whether these top apps choose not to distribute directly to consumers due

<sup>502</sup> Netflix, “Choose your plan,” available at <https://www.netflix.com/signup>, accessed on July 28, 2021.

<sup>503</sup> When clicking the Microsoft Store website online and selecting the “install” button on the Netflix page, Microsoft redirects the user to the pre-downloaded Microsoft Store application where the Netflix app can then be downloaded. It is not possible to download the Netflix app from the Netflix website. See Netflix, “How to download the Netflix app,” available at <https://help.netflix.com/en/node/101653>, accessed on July 28, 2021; Microsoft Store, “Netflix,” available at [https://www.microsoft.com/en-us/p/netflix/9wzdncrfj3tj?cid=msft\\_web\\_appsforwindowsphone\\_collection](https://www.microsoft.com/en-us/p/netflix/9wzdncrfj3tj?cid=msft_web_appsforwindowsphone_collection), accessed on July 28, 2021.

<sup>504</sup> Joseph Yaden, “The Best Selling Video Games of all Time,” *DigitalTrends*, March 25, 2021 available at <https://www.digitaltrends.com/gaming/bestselling-games-of-all-time/> accessed July 29, 2021; Google Play, “Minecraft,” available at [https://play.google.com/store/apps/details?id=com.mojang.minecraftpe&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.mojang.minecraftpe&hl=en_US&gl=US) accessed July 29, 2021; Amazon Appstore, “Minecraft,” available at <https://www.amazon.com/Mojang-Minecraft/dp/B00992CF6W> accessed July 29, 2021.

<sup>505</sup> Google Play, “Roblox,” available at <https://play.google.com/store/apps/details>, accessed July 29, 2021; Amazon Appstore, “Roblox,” available at <https://www.amazon.com/Roblox-Corporation/dp/B00NUF4YOA> accessed July 29, 2021; Microsoft Store, “Roblox,” available at <https://www.microsoft.com/en-us/p/roblox/9nblgggzm6wm> accessed July 29, 2021; Roblox, “How to Install and Play Roblox Using Browser,” available at <https://en.help.roblox.com/hc/en-us/articles/204473560-How-to-Install-and-Play-Roblox-Using-Browser>, accessed on February 9, 2021.

<sup>506</sup> See Figure 32.

<sup>507</sup> Based on Supercell’s website, Clash of Clans is available on Android through Google Play, the Amazon Appstore and on iOS through the App Store, but not as a direct download. See Supercell, “Clash of Clans,” available at <https://supercell.com/en/games/clashofclans/> accessed August 10, 2021.

<sup>508</sup> See Figure 32. Based on Playrix’s website, Homescapes is available on Android through Google Play and the Amazon Appstore, on PCs through the Mac App Store and Windows Store, and on iOS through the App Store, but not as a direct download. See Playrix, “Homescapes,” available at <https://www.playrix.com/en/games/homescapes> accessed August 10, 2021. Based on Niantic’s website, Pokémon Go is available on Android through Google Play and the Galaxy Store and on iOS through the App Store but not as a direct download. Niantic, “Pokemon Go,” available at <https://pokemongolive.com/en/> accessed August 10, 2021. Based on Moon Active’s website, Coin Master is available on Android through Google Play and on iOS through the App Store but not as a direct download. Moon Active, “Moon Active,” available at <https://www.moonactive.com/> accessed August 10, 2021.



to a lack of interest or an inability to do so, the evidence shows that many large developers would not distribute iOS apps directly to consumers in the but-for world.

304. Small developers are even less likely to distribute directly to consumers when given the option. The fixed costs associated with direct distribution are likely to be more prohibitive for small app developers with more limited revenues, and the costs of direct distribution could likely exceed the commission rates charged by app transaction platforms. In addition, small developers that are not already well-known to consumers are less likely to be discovered outside of app transaction platforms, which benefit from indirect network effects and search features. For example, Named Plaintiffs Cameron and Pure Sweat stated in their depositions that their apps are currently not available for download outside of the App Store and Google Play.<sup>509</sup>

305. Finally, survey evidence from Professor Simonson shows that few consumers transact directly with developers for Android apps even though they have the option to do so. In his Survey 5, Professor Simonson finds that 32.7 percent of respondents, all of who own Android devices, had downloaded an app outside of an Android app transaction platform.<sup>510</sup> This suggests that that over two-thirds of proposed consumers class members, which would need to be identified through individualized inquiry, would be unlikely to download an iOS app directly from a developer in the but-for world.

*8.1.4. Developers and consumers vary in terms of the app transaction platforms transacted on when multiple platforms exist for the same device*

306. When there are multiple transaction platforms for the same type of device (e.g., for PCs or for Android devices), available evidence shows that developers and consumers vary in terms of where they choose to transact, which is consistent with these app transaction platforms being differentiated and with “variation in the strategies that app distributors use to attract customers and developers to their platforms.”<sup>511</sup> In fact, many developers and consumers choose to transact through platforms with higher commission rates even when platforms with lower commission rates are available.

307. For example, the top apps by revenue and downloads on Google Play vary in whether they transact through the Amazon Appstore or the Samsung Galaxy Store. Figure 32 shows

<sup>509</sup> Cameron Deposition, p. 91:19–24 (“Q. Okay. Do you have a website for your app? A. I do. Q. Is there a way to purchase your app directly on the website? A. The website has links to the iOS and the Android stores.”); Pure Sweat Deposition, p. 8:20–242 (“Q. They are native apps. Is there any other way it could be accessed by a would-be user, other than going to the App Store or the Google Play Store? A. Not to my knowledge.”).

<sup>510</sup> Expert Report and Declaration of Itamar Simonson, Ph.D., August 10, 2021, (“Simonson Report”), Exhibit 66.

<sup>511</sup> Elhauge Report, ¶ 328.



the top ten game developers by revenue in 2019 based on App Annie data and indicates whether these developers also transact through the Amazon Appstore or the Samsung Galaxy Store. While all of these developers except for Niantic (the developer of Pokémon Go) transact on the Amazon Appstore, five of the developers transact on the Samsung Galaxy Store. Thus, while some of the top game developers choose to transact through all three of these Android app transaction platforms, other top game developers on Google Play choose to transact through only one of the two other top Android app transaction platforms.

**FIGURE 32**

*Additional Android app transaction platforms for top game developers on Google Play, 2019*

Rank <sup>[1]</sup>	Developer	Top App	Amazon Appstore	Samsung Galaxy Store
1.	King	Candy Crush Saga	✓	
2.	Playrix <sup>[2]</sup>	Homescapes	✓	✓
3.	Supercell	Clash of Clans	✓	
4.	Playtika	Slotomania Slots Casino: Vegas Slot Machine Games	✓	✓
5.	Moon Active	Coin Master	✓	
6.	Niantic, Inc.	Pokémon GO		✓
7.	Century Game	Guns of Glory: Build an Epic Army for the Kingdom	✓	✓
8.	Peak	Toon Blast	✓	
9.	Scopely	Star Trek Fleet Command	✓	✓
10.	Tencent Games	PUBG MOBILE	✓	✓

Source: App Annie Data; See backup for full list of sources

Note:

[1] Rank is determined by the developers on Google Play that generated the greatest game app revenue in calendar year 2019. A check mark under any transaction platform indicates that developer offers at least one game app on that transaction platform.

[2] Playrix is also known as PLR Worldwide Sales Limited on the Mac App Store. The company uses these names interchangeably. See Playrix, "Terms of Use," January 29, 2020, available at <https://www.playrix.com/en/terms/index.html>, accessed on August 5, 2021.

308. As an example based on data produced in this matter, I analyze data on sales for Playtika, developer of the game Slotomania. The game is offered through the App Store, Google Play, the Amazon Appstore, and other app transaction platforms. [REDACTED]

309. Survey evidence from Professor Simonson also shows that many consumers, despite being aware of them, do not transact on alternative Android app transaction platforms other than Google Play. For example, Professor Simonson finds that while 33.8 percent of respondents were aware of the Amazon Appstore, only 3.4 percent of respondents had

512 [REDACTED]

transacted through the Amazon Appstore.<sup>513</sup> Meanwhile, 78.2 percent of respondents had transacted through Google Play. Even for respondents who owned a Samsung device, which come pre-loaded with the Samsung Galaxy Store, only 6.6 percent had transacted through the Samsung Galaxy Store while 66.6 percent were aware of the Samsung Galaxy Store.<sup>514</sup>

310. These results provide strong evidence that consumers generally choose to transact through the largest app transaction platform (i.e., one that has the largest indirect network effects). Thus, the results suggest that consumers would still choose to transact through the App Store in the but-for world.

311. Multiple transaction platforms are available for PC apps, and there is significant variation on whether developers and consumers transact on multiple PC app transaction platforms. For example, in Figure 33, I consider the top 25 games on the Epic Games Store by sales to determine whether these games are also available on Steam. I find that 12 are also available on Steam. As I discussed in Section 5.5.2, even for the highest-revenue games, Steam charges a 20 percent commission rate while the Epic Games Store charges a headline commission rate of 12 percent. Thus, even though the commission rate for these 12 games are almost certainly lower on the Epic Games Store, the developers of these games nevertheless choose to also transact on Steam.

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<sup>513</sup> Professor Simonson finds that a de minimus proportion of respondents were even aware of smaller app iOS transaction platforms such as Aptoide and GetJar. Simonson Report, Exhibit 65.

<sup>514</sup> Simonson Report, Exhibit 65.

**FIGURE 33*****Epic Games Store top selling games available on Steam***

<b>Top Game</b>	<b>Developer</b>	<b>Steam</b>
Grand Theft Auto V: Premium Edition	Rockstar Games	✓
Rocket League	Psyonix LLC	
Chivalry 2	Torn Banner Studios	
HITMAN 3	IO Interactive	
NBA 2K21	Visual Concepts	✓
Assassin's Creed: Valhalla	Ubisoft Montreal	
Borderlands 3	Gearbox Software	✓
Rogue Company	Hi-Rez Studios	✓
Red Dead Redemption 2	Rockstar Games	✓
Old World	Mohawk Games	
Sid Meier's Civilization VI	Firaxis Games	✓
World War Z GOTY	Saber Interactive	
Cyberpunk 2077	CD PROJEKT RED	✓
KINGDOM HEARTS HD 1.5+2.5 ReMIX	Square Enix	
Tony Hawk's Pro Skater 1+2	Vicarious Visions	
Dauntless	Phoenix Labs	
Days Gone	Bend Studio	✓
SnowRunner	Saber Interactive	✓
KINGDOM HEARTS III + Re Mind	Square Enix	
Anno 1800	Blue Byte	
Paladins	Evil Mojo Games	✓
Watch Dogs: Legion	Ubisoft	
Space Punks - Founders Swag Pack	Flying Wild Hog	
ARK: Survival Evolved	Studio Wildcard	✓
Idle Champions of the Forgotten Realms	Codename Entertainment	✓

Source: See backup for a full list of sources

Note: Show list of top selling games as of August 3, 2021. See "Top Sellers," Epic Games, August 3, 2021, available at <https://web.archive.org/web/20210803224435/https://www.epicgames.com/store/en-US/collection/top-sellers>, accessed on August 8, 2021.

312. Further, multiple app transaction platforms are available for macOS apps, and developers vary on which platforms they choose to make macOS transactions. This is illustrated by top developers on the Mac App Store.<sup>515</sup>

- The game Jackbox Party pack 3, from the developer Jackbox Games, is available for macOS through Steam, the Epic Games Store, and the Mac App Store.<sup>516</sup>

<sup>515</sup> See my workpapers.

<sup>516</sup> jackboxgames, "The Jackbox Party Pack 3," available at <https://www.jackboxgames.com/party-pack-three/>, accessed on August 10, 2021.

- The developer Playrix has a number of games on the Mac App Store, such as “Township,” but it does not appear to make transactions for any MacOS games through Steam, GOG.com, or the Epic Games Store.<sup>517</sup>
- The developer WARGAMING varies on which macOS transaction platforms is transacts depending on the game. For instance, the macOS version of the game Master of Orion is available through GOG.com and Steam but not on the Mac App Store while the macOS version of the game World of Tanks Blitz is available through the Mac App Store and Steam.<sup>518</sup>

313. Finally, evidence from app developers in this matter also shows that these developers differ in terms of the platforms on which they transact their PC apps and on which they transact their Android apps. For example, Named Plaintiff Cameron stated in his deposition that his app, Lil’ Baby Names, is available for Android devices only through Google Play due to the platform’s consumer reach.<sup>519</sup> Named Plaintiff Pure Sweat similarly stated that it transacts through Google Play but has chosen not to transact through other Android app transaction platforms such as the Samsung Galaxy Store and was not sure whether it would transact through other iOS app transaction platforms if there were alternatives to the App Store.<sup>520</sup>

<sup>517</sup> Playrix, “Township,” available at <https://www.playrix.com/games/township>, accessed on August 10, 2021.

<sup>518</sup> Wargaming, “All Games,” available at <https://na.wargaming.net/en/games/wotb> and <https://na.wargaming.net/en/games/moo>, accessed on August 10, 2021; Wargaming, “Master of Orion,” available at <https://na.wargaming.net/en/games/moo>, accessed on August 10, 2021; Wargaming, “World of Tanks Blitz,” available at <https://na.wotblitz.com/en/#/>, accessed on August 10, 2021; Steam, “World of Tanks Blitz,” available at [https://store.steampowered.com/app/444200/World\\_of\\_Tanks\\_Blitz/](https://store.steampowered.com/app/444200/World_of_Tanks_Blitz/), accessed on August 10, 2021.

<sup>519</sup> Cameron Deposition, p. 99:10–25 (“Q. And in deciding to put -- make an app for Android, you decided to make your app available on Google Play; right? A. Yes. Q. There are other app stores available on Android devices; correct? A. Yes. Q. Like the Samsung Galaxy store; correct? A. Yes. Q. Okay. Why did you choose Google Play? A. Reach. Q. What do you mean by that? A. Only some people have Samsung phones that are Android devices. All -- all people have the Play Store. All Android device users have access to the Play Store.”).

<sup>520</sup> Pure Sweat Deposition, p. 82:13–24 (“How -- how can a person access the Pure Sweat app today? A. They can go to either the App Store or the Play Store and purchase a subscription. Q. So you have to an Android or an iOS device and -- and access it, correct? A. Correct. They are both native apps. Q. They are native apps. Is there any other way it could be accessed by a would-be user, other than going to the App Store or the Google Play Store? A. Not to my knowledge.”), p. 184:13–18 (“Q. ...Now, [your app] is available, you said, on the -- on the Google Play Store and Android, right? A. Correct. Q. But it is not available on, for example, the Samsung Galaxy Store on Android, right? A. I don't believe so.”); p. 186:5–24 (“Q. If -- if -- if there were other stores other than the App Store on iOS, would -- would your company look into that or would it just stay with the App Store? A. I would need more information on what was available. Q. Okay. Well, why -- why would there -- is there any reason to believe that if you -- if you did not look -- your company did not look to put it on other stores on the Android, is there any reason to believe your company would -- would, in fact, put it on other stores on the iOS? A. I can't speak to the future, only to the past, and, to date, we have not looked at other stores. Q. There are no exclusivity agreements preventing your company from listing your app on other stores, other than Google Play on Android, right? A. Not that I'm aware of.”).

*8.1.5. Many developers and consumers would choose to continue to transact on the App Store, either in full or in part, in the but-for world even if the App Store maintained its current commission rates*

314. As the real world evidence shows, even if the App Store were to charge the same commission rates in the but-for world that it charges in the actual world, a large number of proposed developer and consumer class members would likely still transact through the App Store in the but-for world and pay the same commission rates. As Professor Economides acknowledged during his deposition, some proposed developer class members are likely to transact through the App Store even if there were lower commission rates offered on potential alternative iOS app transaction platforms or if it were less expensive to distribute directly to consumers because the App Store will likely continue to offer benefits to developers and consumers that other transaction platforms would not match.<sup>521</sup> Consumers may also choose to continue to transact through the App Store since, as I discuss in Section 8.3, developers may choose not to reduce consumer prices on other iOS app transaction platforms even if those platforms have lower commission rates.

315. Moreover, since some potential iOS app transaction platforms may charge commission rates in the but-for world that are similar to the commission rates the App Store charges in the real world, many developers and consumers would likely choose to transact on the App Store. Alternatively, some developers may be able to negotiate individualized commission rates.

316. Survey evidence from Professor Simonson shows that consumers value many aspects of the App Store that may not be available on other iOS app transaction platforms and therefore would likely lead to many consumers continuing to transact on the App Store in the but-for world. In Professor Simonson's Survey 1 (Cell A), iOS device owners were asked to allocate 100 points across different App Store features based on how valuable these features were to them.<sup>522</sup> The top responses, on average, were privacy, malware protection, and the number of free apps.<sup>523</sup> These same respondents were also asked which features they viewed as "must-haves" (as compared to features for which they were "willing to compromise"); the top two "must-have" features were privacy (chosen by 87.2 percent of respondents) and malware protection (chosen by 73.8 percent of respondents).<sup>524</sup> At the same time, there was significant variation in the number of points allocated to each feature by respondents, illustrating how

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<sup>521</sup> Economides Deposition, pp. 202:21–203:2 ("Second, even if the Apple Store charges 30, developers will have a choice, and not only they could sell everything they -- they want to sell through Epic, but also they could break their sales through different stores. So some are going to go through Apple. Some are going to go through others.").

<sup>522</sup> Simonson Report, Section IV.A.3.a.

<sup>523</sup> Simonson Report, Exhibit 6 and Exhibit 7.

<sup>524</sup> Simonson Report, Exhibit ¶ 57.

iOS device owners vary in their preference for App Store features. Thus, in the but-for world, many proposed consumer class members are likely to continue to transact through the App Store due to its strong privacy and malware protections; however, due to variation in preferences, determining which proposed consumer class members would do so would require individualized inquiry.

317. Professor Simonson's other surveys also determined whether iOS device owners would continue to transact through the App Store, even if app prices were lower on other iOS app transaction platforms. For example, in Professor Simonson's Survey 1 (Cell B), iOS device owners were asked to choose between downloading apps through the App Store versus another iOS app transaction platform ("Store B") with 15 percent lower average prices for paid downloads and in-app purchases but less information about various features of Store B.<sup>525</sup> Professor Simonson finds that 83.2 percent of respondents would continue to transact through the App Store despite the higher average app prices.<sup>526</sup>

318. In Professor Simonson's Survey 2, iOS device owners were given three choice problems in which they had to choose between downloading apps through the App Store versus another iOS app transaction platform ("Store B") with limited information on malware protection, privacy, and app-by-app quality control as well as lower app variety compared to the App Store. In each choice problem, the median prices on Store B varied, with median prices on Store B either the same price as the App Store, 15 percent lower, or 25 percent lower.<sup>527</sup> Across all of these choices, respondents indicated they would make most or all of their transactions through the App Store rather than Store B.<sup>528</sup> At the same time, respondents vary in whether they would transact through Store B and, if so, whether they would transact entirely through Store B, mostly through Store B, equally through the App Store and Store B, or mostly through the App Store.

319. Finally, in Professor Simonson's Survey 3, iOS device owners were again given three choice problems in which they had to choose between downloading apps through the App Store versus another iOS app transaction platform ("Store B"). This time, the median prices on Store B varied across choices as well as the level of other features, including malware protection, privacy, and app-by-app quality control. Professor Simonson finds that:

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<sup>525</sup> Simonson Report, Section IV.A.3.b.

<sup>526</sup> Simonson Report, Section IV.A.3.b. Professor Simonson also find that among those that would continue to transact through the App Store, the most important features driving that decision was malware protection and privacy. Simonson Report, Section IV.A.3.b, Exhibit 13.

<sup>527</sup> Simonson Report, Section IV.B.1.c, Exhibit 22.

<sup>528</sup> Simonson Report, Section IV.B.1.c, Exhibit 22.

- For choices related to malware protection, approximately 50 percent of survey respondents indicated they would continue to make all of their transactions and over two-thirds say they would make most of their transactions through the App Store if the App Store offered superior malware protection but also charged higher prices.
- For choices related to privacy, over 41 percent of survey respondents indicated they would continue to make all of their transactions and over 65 percent said they would make most of their transactions through the App Store if the App Store offered greater privacy but also charged higher prices.
- For choices related to app-by-app quality control, between 34.5 percent and 46.0 percent of survey respondents indicated they would continue to make all of their transactions and over 60 percent said they would make most of their transactions through the App Store if the App Store offered superior app-by-app quality control but also charged higher prices.<sup>529</sup>

320. Taken together, the survey evidence from Professor Simonson consistently shows that many proposed consumer class members have preferences for the features provided by the App Store and would continue to transact through the App Store in the but-for world, even if the App Store offered higher commission rates than other iOS app transaction platforms. Many proposed consumer class members would thus likely continue to transact through the App Store in the but-for world, even if the App Store maintained its current commission rates in the but-for world. These consumers would not be harmed by Apple's challenged conduct, and determining which proposed consumer class members would transact through the App Store versus other potential iOS transaction platforms or directly with developers would require individualized inquiry.

*8.1.6. Plaintiffs' experts have no method to determine which developers and consumers would transact outside the App Store, or at lower commissions, in the but-for world*

321. The evidence I have developed shows that the App Store and other potential iOS app transaction platforms in the but-for world would be differentiated from each other. Similarly, developers would face different costs of distributing directly to consumers. Consistent with this, proposed developer and consumer class members would vary in whether they would choose to transact on the App Store, on an alternative iOS app transaction platform, or directly in the but-for world. Many developers and consumers would ultimately choose to continue to transact on the App Store, either in full or in part.

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<sup>529</sup> Simonson Report, Section IV.B.2.c.



322. Despite these facts, Plaintiffs' experts have provided no analysis of these outcomes and have not provided a method (let alone a common method) to determine which developers and consumers (if any) would transact outside the App Store. For instance, in his deposition, Professor Economides stated that he did not know how many developers currently transact through multiple app transaction platforms or distribute directly, nor how many would engage in direct distribution in the but-for world.<sup>530</sup> He also could not say how Named Plaintiff Cameron would distribute his app in the but-for world and instead just assigned him the average but-for commission rate he calculated.<sup>531</sup> In his deposition, Professor Elhauge, when asked how he would "determin[e] whether a specific member of the class would choose multiple distributors in a but-for world where Apple ... continues to charge a 30 percent default commission," he answered "I don't know. I haven't investigated that because that wasn't my methodology."<sup>532</sup>

323. As a result, Plaintiffs' experts cannot determine which developers would pay a lower commission rate in the but-for world, and they cannot figure out which consumers would transact with those developers in the but-for world. Plaintiffs' experts thus do not have a common method to determine which proposed consumer and developer class members are harmed or the quantum of damages, if any. Individual inquiry is instead required to determine both impact and damages.

***8.2. Other fees charged by the App Store and alternative iOS transaction platforms may differ in the but-for world, causing some proposed class members to be worse off in the but-for world***

324. Plaintiffs' experts assume, or only consider (but do not analyze), that in the but-for world, the only aspect of the App Store that would differ from the actual world is the commission rate charged by Apple. However, this ignores the fact that while Apple and other app transaction platforms have all chosen to charge commissions on app transactions, they also vary in what other fees they charge (if any) and what services and features (or bundles of services and features) they provide for free.<sup>533</sup> Plaintiffs' experts have assumed, either explicitly or implicitly, that in the but-for world Apple would not change *any* of the services

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<sup>530</sup> Economides Deposition, pp. 67:11–70:1.

<sup>531</sup> Economides Deposition, p. 12:95–13 ("Q. And did you analyze how Mr. Cameron would distribute his app in the but-for world? A. Well, I -- I gave him the average overcharge so, you know -- and I'm not -- I wouldn't be able to say exactly how he's going to distribute it in the but-for world. But I -- I assume he would use the various marketplaces that would be in the but-for world, including possibly Apple.").

<sup>532</sup> Elhauge Deposition, p. 198:3–10.

<sup>533</sup> See Section 5.5.

it offers or the ways it monetizes the App Store other than lowering its commission rates.<sup>534</sup> In reality, Apple could, and would have incentives to, adopt different approaches to monetizing the App Store in the but-for world. In addition, other iOS app transaction platforms could adopt different approaches than the App Store. Since such changes would be expected to impact different developers and consumers in varying ways, common facts would not allow one to determine whether any proposed developer or consumer class members have been harmed by Apple's challenged conduct relative to the but-for world.

325. In this section, I first describe the variation in how app transaction platforms monetize in the real world. I then discuss how likely changes to Apple's annual developer fee or fees to access its SDK and other developer tools would be expected to make some class members worse off in the but-for world. Finally, I discuss how the way that Apple monetizes its intellectual property could differ in the but-for world and how this would impact proposed class members differentially. Thus, individualized inquiry would be required to determine whether individual members of the proposed class have been harmed by Apple's challenged conduct.

*8.2.1. Other app transaction platforms charge various fees in order to generate revenue and to license their intellectual property*

326. Existing app transaction platforms vary in how they monetize and what services and features they provide to developers and consumers. Exhibit 5 in Professor Schmalensee's report shows that app transaction platforms like the App Store have chosen different strategies to generate revenue and different policies related to revenue generation. For example, app transaction platforms differ in terms of whether and, if so, how much they charge to access intellectual property and specific tools provided by the platform, as well as the fee to transact through the platform. While the App Store charges each developer \$99 per year to transact through the App Store and license some of its intellectual property and developer tools, other platforms have adopted different policies and fees. For example, Microsoft charges individuals \$19 and companies \$99 one-time fees to transact PC apps on the Microsoft Store but then charges separately for some developer tools such as Visual Studio for Business.<sup>535</sup> While the App Store does not charge a commission on in-app

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<sup>534</sup> See, e.g., Economides Report, ¶ 70 ("I assume that, in the but for world, competition from other distribution methods would not reduce Apple's pricing of its Developer Program, and moreover that developers using other distribution channels would nevertheless value the tools, SDK, and testing provided through the program and would continue to pay the \$99 annually."). In his deposition, Professor Elhauge was asked "have you identified any aspects of license compensation that would be different in the but-for world in your report?" He responded "for – license compensation, just the commission difference." Elhauge Deposition, p. 96:19–23.

<sup>535</sup> Schmalensee Report, Exhibit 5.A; Microsoft, "Account types, locations, and fees," accessed on August 8, 2021, available at <https://docs.microsoft.com/en-us/windows/uwp/publish/account-types-locations-and-fees>; Microsoft, "Visual

advertising, other app transaction platforms do; for instance, Amazon charges a 10 percent commission on in-app advertisements.<sup>536</sup> Some app transaction platforms also charge for app review: for example, Valve charges a \$100 fee, which includes game review, for each game that a developer transacts on Steam.<sup>537</sup>

327. These examples, and the others that Professor Schmalensee presents in Exhibit 5, highlight how other app transaction platforms have adopted different policies compared to Apple. Thus, Apple would have flexibility to adopt different monetization strategies and policies in the but-for world in which other platforms could transact iOS apps. While it is not possible to determine exactly how Apple's other policies would differ in the but-for world, analyzing some reasonable policy changes highlights why these policies must be analyzed to determine whether proposed developer and consumer class members are impacted by Apple's challenged conduct or whether a significant number of proposed developer and consumer class members are unharmed by Apple's challenged conduct.

*8.2.2. Many proposed developer and consumer class members would be unharmed by Apple's challenged conduct if Apple changed its annual developer fee or fees for access to Apple's SDK and other tools in the but-for world*

328. As previously discussed, Apple provides its SDK and other developer tools for free and charges a \$99 annual developer fee (\$299 annual developer fee for developers in its Enterprise Program) to transact apps through the App Store.<sup>538</sup> In the but-for world, Apple could require all developers to pay an annual fee to access its SDK and other developer tools. This could take the form of a fee to access Apple's SDK and developer tools to developers that do not transact through the App Store or a higher annual developer fee for those that do transact through the App Store.<sup>539</sup>

329. In this case, all developers would face an increase in cost through these higher fees. However, the impact of such a change would vary by developer. Some developers, especially large ones with significant revenues from their apps, may choose to do nothing and simply pay the higher fees, leading to reduced profits. Other developers could choose to raise prices to consumers to offset the increase in the annual fees. Alternatively, some app developers

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Studio Professional 2019," accessed on August 8, 2021, available at <https://www.microsoft.com/en-us/d/visual-studio-professional-2019/dg7gmgf0f6q1?activetab=pivot%3aoverviewtab>.

<sup>536</sup> Schmalensee Report, Exhibit 5.B.

<sup>537</sup> Schmalensee Report, Exhibit 5.B; Steamworks, "Steam App Fee," accessed on August 8, 2021, available at <https://partner.steamgames.com/doc/gettingstarted/appfee>.

<sup>538</sup> See ¶ 54.

<sup>539</sup> While I am not asserting that Apple would necessarily do this in the but-for world, this example highlights the need to account for such differences in fees charged by Apple between the actual world and the but-for world.

may simply not develop apps at all in the but-for world if Apple charged higher annual developer fees or charged to access developer tools. Ultimately, how a developer would be impacted in the but-for world would vary across app developers, and many proposed developer class members would likely be unharmed by Apple's challenged conduct.

330. To demonstrate how it is necessary to account for changes in these fees to determine impact and harm, suppose that Apple were to add a \$100 annual fee for use of its SDK and developer tools, whether or not the developer transacted through the App Store. This would increase the annual fees it charges developers who transact through the App Store from the current \$99 annual developer fee to a total annual developer fee of \$199. This \$199 fee could be made up of multiple fees, such as an annual developer fee to transact on the App Store plus an annual fee charged to all developers to access Apple's SDK and developers tools.

331. The idea that Apple could raise fees by \$100 is not implausible since a \$199 fee is still less than the \$299 annual cost of Apple Developer Enterprise Program, which Apple offers to large organizations that would like develop and deploy proprietary, internal-use apps to their employees.<sup>540</sup>

332. I can analyze how this would impact proposed developer class members calculated by Professor Economides by assuming, contrary to the evidence I previously discussed, that but-for commission rates charged on all iOS app transaction platforms would equal those assumed by Professor Economides and that damages for each developer equals the difference between the actual commission rate and the but-for commission rate, multiplied by the actual quantity. In other words, I can analyze how his damages estimates for each developer compare to the potential \$100 increase in the annual fee to determine whether the developer is worse off in the but-for world, and thus unharmed by Apple's challenged conduct.

333. Based on these assumptions, it is clear that any developer that generated less than \$100 in damages per year in Professor Economides model would actually be *worse* off in the but-for world if Apple increased the total annual fee to developers by \$100. I show in Figure 34 the distribution of proposed class developers by estimated damage per year using Professor Economides model. As shown, [REDACTED] of all proposed developer class members would be worse off in the but-for world, even under the unrealistic but-for commission rates proposed by Professor Economides. In other words, in this setting, [REDACTED] of proposed developer class members would be unharmed by Apple's alleged conduct after accounting for a potential change in Apple's annual developer fees.<sup>541</sup> In fact, even if the total annual fee

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<sup>540</sup> See ¶ 54.

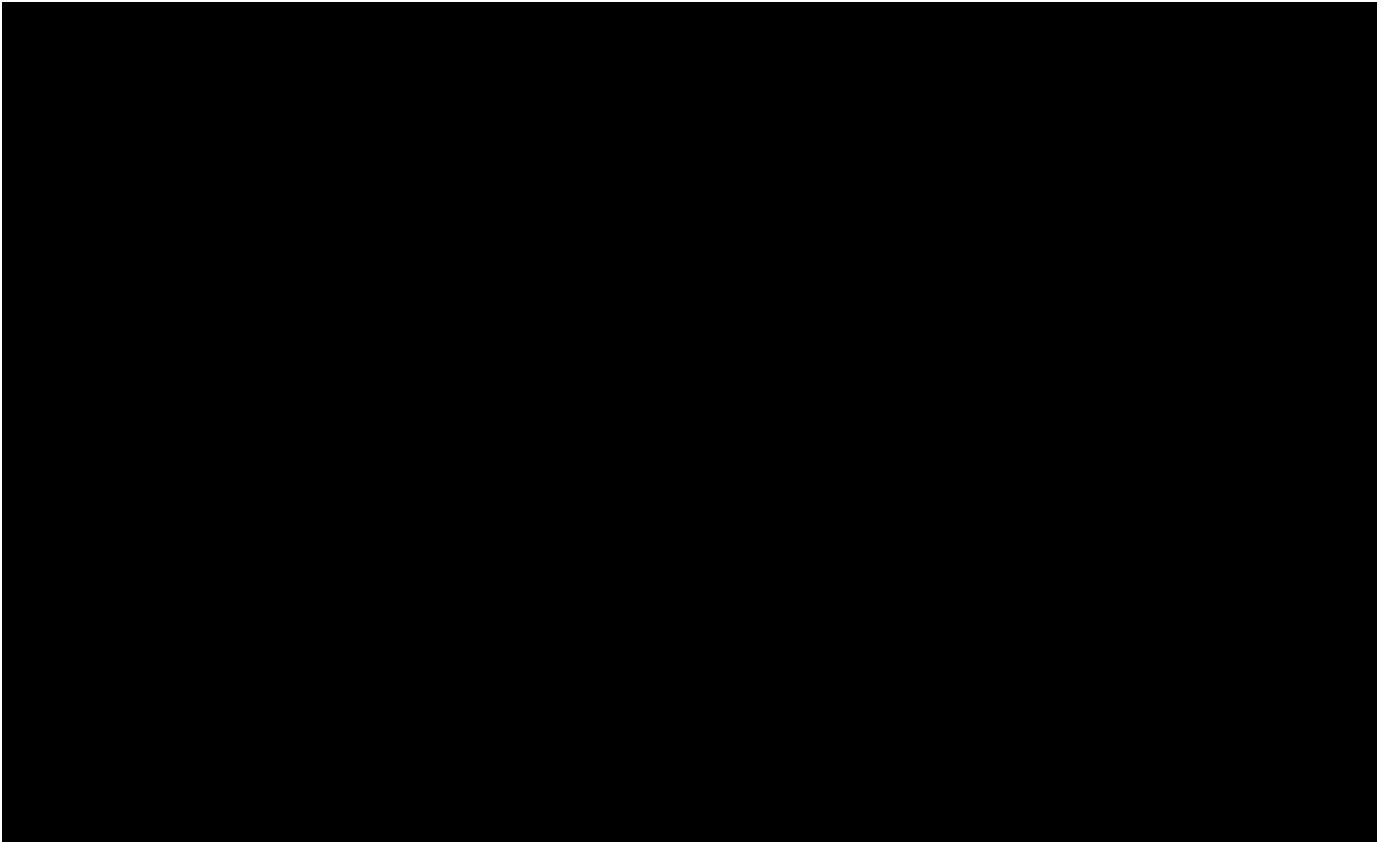
<sup>541</sup> See my workpapers.

to developers only increased by \$50 in the but-for world. [REDACTED] of all proposed developer class members would be worse off in the but-for world, demonstrating how even a relatively small change in how Apple would generate revenue on the App Store in the but-for world could lead to many unharmed proposed developer class members.

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**FIGURE 34**

*Distribution of proposed developer class members damages per year under Professor Economides model (June 4, 2015 – April 25, 2021)*



Source: Apple transaction data

Note: Damages are calculated following Economides damages model and applying a but-for commission rate to total billings of transactions at the 30% and 15% commission tiers. For this analysis, I use Professor Economides' but-for average effective commission rate of 13.0% from his rival profit yardstick model with two entrants. I also use his 2:1 ratio method for decomposing the average effective commission rate into two tiers. Average damages per year are calculated as total damages for a proposed developer class member divided by the number of membership years the developer has transactions for in the data through the developer class period. Membership years are calculated as the time between a developer's last transaction and first transaction, rounded up to the nearest year. Only transactions associated with developers in the proposed developer class are included. 4 developers with negative damages are excluded from this analysis. Each bucket includes the smaller value and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

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334. Consumers could be directly affected by these changes as well. My analysis in Figure 34 suggests that the majority of developers would face higher total costs in the but-for world if Apple were to make even modest changes in fees for its developer program. Some of these developers may exit, depriving consumers of whatever value they obtained from the iOS apps that would be available in the real world but would not be available in the but-for world.

Other developers could choose not to lower their prices, or to even raise their prices, in the but-for world to cover their increased total transaction costs despite having a commission rate reduction. In this case, proposed consumer class members that purchased apps from these developers would therefore not be harmed by Apple's challenged conduct on those purchases, and any proposed consumer class member that only purchased apps from such developers would ultimately be unharmed in general.

*8.2.3. Changes in how Apple licenses its intellectual property in the but-for world could impact the overall cost of app transactions, which could have differential effects on individual developers and consumers in the proposed classes*

335. Beyond raising the annual fees that developers pay to transact on the App Store, Apple could adopt other ways of licensing its intellectual property. As discussed by Mr. Malackowski, Apple would likely reassess how it monetizes the iOS ecosystem and the App Store in the but-for world, resulting in potential changes to how it licenses its intellectual property.<sup>542</sup> For example, Apple would have an incentive to modify how it licenses its intellectual property for developers that rely on Apple's intellectual property to develop iOS apps but then avoid paying commissions to Apple in the but-for world by transacting outside of the App Store. Charging such a fee would allow Apple to recover lost revenues from developers that benefit from Apple's intellectual property but otherwise do not pay Apple.

336. Professor Economides, for instance, assumes that Apple would continue to provide developers valuable intellectual property for free in the but-for world, even if those developers transact outside of the App Store.<sup>543</sup> In fact, Professor Economides stated that if the finder of fact determined that Apple could change its other fees in the but-for world, he would need to alter his analyses.<sup>544</sup>

337. While it is not possible to know how Apple might choose to charge for its intellectual property for developers that do not transact through the App Store in the but-for world, it could choose one of several options.<sup>545</sup> For example, as discussed in the prior section, it

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<sup>542</sup> Malackowski Report, Section 10.1.

<sup>543</sup> Economides Report, ¶ 70 ("Because Apple is an operating system owner, and this is rational economic behavior for operating system owners, I expect that in the but-for world, Apple will provide the Apple Developer program to all potential iOS programmers. This is true even if, in the but for world, Apple does not control the means to distribute iOS apps on iOS devices. We already see that Apple owns an operating system, Mac OS, for which it does not control the only means of app distribution, and for which it provides support for its developers through the Apple Developer Program.").

<sup>544</sup> Economides Deposition, p. 113:9–15 ("If the finder of fact says, You -- you, third-party store, any developer who sells through you has to pay whatever this number is that you just mentioned to Apple for certification, then I'll have to take that into consideration and alter the amount of damages in my report.").

<sup>545</sup> In his deposition, Professor Elhauge agreed that in the but-for world Apple could potentially charge license fees for its intellectual property. Elhauge Deposition, pp. 93:24–95:5.



could charge a use fee to developers to access its SDK and developer tools. It could also choose to charge a percentage royalty for developers to use certain APIs or tools, consistent with how Epic charges a 5 percent royalty on all revenues (including in-app advertising) generated by apps that use Epic's Unreal Engine to develop the app.<sup>546</sup>

338. As one example, Apple could choose to charge a royalty on app revenues generated by developers that use Apple's Metal API that do not transact on the App Store in the but-for world. Apple's Metal API is a graphics framework that Apple introduced in 2014 and that allows developers to almost fully access the device's graphics processing unit ("GPU") capabilities.<sup>547</sup> Metal allows developers to implement better graphics quality in their apps and especially benefits developers of premium games.<sup>548</sup> For example, Epic utilized the Metal API when developing the iOS app for Fortnite Battle Royale, and one Epic engineer stated that Metal's features allowed Epic "to bring the full Fortnite Battle Royale experience to iOS quickly."<sup>549</sup> However, other app developers that do not have graphics-intensive iOS apps are less likely to use Metal.<sup>550</sup>

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<sup>546</sup> Epic Games, "Unreal® Engine End User License Agreement For Publishing," available at <https://www.unrealengine.com/en-US/eula/publishing>, accessed on July 28, 2021.

<sup>547</sup> Apple Developer, "Metal," available at <https://developer.apple.com/metal>, accessed on February 13, 2021 ("Metal provides near-direct access to the graphics processing unit (GPU), enabling you to maximize the graphics and compute potential of your apps on iOS, macOS, and tvOS. Building on an approachable, low-overhead architecture with precompiled GPU shaders, fine-grained resource control, and multithreading support, Metal further evolves support for GPU-driven command creation, simplifies working with the array of Metal-capable GPUs, and lets you tap into Pro power of Mac Pro and Pro Display XDR."); Apple, "Working with Metal: Overview," available at <https://developer.apple.com/videos/play/wwdc2014/603/>, accessed on March 13, 2021 ("Metal provides extremely efficient access to the graphics and compute power of the A7 chip"); Roblox, "3 Years of Metal," May 21, 2020, available at <https://blog.roblox.com/2020/05/3-years-metal/>, accessed on March 13, 2021 ("...Apple announced Metal at WWDC in 2014..."); Sam Machkovech, "Apple gets heavy with gaming, announces Metal development platform," *Ars Technica*, June 2, 2014, available at <https://arstechnica.com/gadgets/2014/06/apple-gets-heavy-with-gaming-announces-metal-development-platform/>, accessed on March 13, 2021 ("...Metal is designed for the A7 processor and provides complete access to the compute power of its GPU.").

<sup>548</sup> Dean Takahashi, "Graphics guru Tim Sweeney explains why Apple's Metal will make mobile games far better," *VentureBeat*, June 3 2014, available at <https://venturebeat.com/2014/06/03/graphics-guru-tim-sweeney-explains-why-apples-metal-will-make-games-run-10-times-more-efficiently/>, accessed on March 14, 2021 ("We'll see an immediate, significant improvement in the number of objects and the complexity of the scenes they can build without having to do constant work themselves."); Daniel Eran Dilger, "Inside Metal: How Apple plans to unlock the secret graphics performance of the A7 chip," *Apple Insider*, June 16, 2014, available at <https://appleinsider.com/articles/14/06/16/inside-metal-how-apple-plans-to-unlock-the-secret-graphics-performance-the-a7-chip>, accessed on March 13, 2021 ("For the cream of the mobile market, a premium segment that plays video games and cares about powerful mobile apps...the A7 is both literally and figuratively a game changer.").

<sup>549</sup> Deposition of Nicholas Penwarden (Epic), January 26, 2021, p. 66:2–16 ("Q. Okay. And then the next part of that email says, 'Here is a starting point: The performance and features of Metal allowed us to bring the full Fortnite Battle Royale experience to iOS quickly and at higher quality than is possible with OpenGL.' [...] And do you still agree with that sentence today? A. I do, with the same context that I gave above.").

<sup>550</sup> Developers vary in their use of other Apple developer tools as well. For instance, a 2018 internal Apple survey of developers from US, UK, China, Japan, and India found some developers used certain Apple tools, such as ARKit or CoreML, while others did not. See Apple, "FY18 Developer Survey Results China, India, Japan, UK, and US," July 2018, APL\_APPSTORE\_09584333 at 379–382.



339. Apple does not currently charge developers separately to use the Metal API. In the but-for world, Apple could choose to implement a licensing fee for developers that take advantage of the Metal API. In particular, Apple could choose to implement a licensing for developers that use the Metal API but transact outside of the App Store and therefore generate revenue by using Apple's intellectual property without otherwise paying any fees to Apple.

340. One model for such a royalty for the use of intellectual property is the licensing structure that Epic Games has adopted for developers that use its Unreal Engine, a game development engine. Epic Games currently charges a 5 percent royalty on all revenues (including in-app purchases, paid downloads, and in-app advertising but excluding revenues earned through the Epic Games Store) over \$1 million earned by developers that use the Unreal Engine to develop a game and that transact on any app transaction platform.<sup>551</sup> Mr. Malackowski further discusses how other companies that operate app transaction platforms license their intellectual property, including Valve.<sup>552</sup>

341. While I do not know how Apple would structure a potential royalty to license its Metal API in the but-for world if it were to implement one, the licensing model by Epic Games for the Unreal Engine demonstrates how the effect of such a license can have a varying impact on proposed developer class members. Such a licensing arrangement for Metal API would not affect some developers, such as small developers that do not earn above the revenue threshold or developers that do not use Metal. However, it could have a significant revenue impact on developers that choose to transact through other iOS app transaction platforms in the but-for world or that monetize through other strategies that do not otherwise incur commissions, such as in-app advertising.

342. For some developers, a potential royalty to license Apple's intellectual property like Metal in the but-for world could outweigh any potential reduction in commissions paid, even if (contrary to my prior arguments) all iOS app transaction platforms charge a lower commission rate, as assumed by Professor Economides, Professor Elhauge, and Professor

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<sup>551</sup> Unreal Engine, "Frequently Asked Questions (FAQ)," available at <https://www.unrealengine.com/en-US/faq>, accessed on August 9, 2021; Unreal Engine, "Unreal® Engine End User License Agreement For Publishing," available at <https://www.unrealengine.com/en-US/eula/publishing>, accessed on August 9, 2021; Tyler Wilde, "Unreal Engine games no longer owe royalties on their first \$1M in revenue," May 13, 2020, available at <https://www.pcgamer.com/unreal-engine-games-no-longer-owe-royalties-on-their-first-dollar1m-in-revenue/>, accessed on August 9, 2021. This royalty is waived for revenue generated through the Epic Games Store. See Epic, "Welcome to Epic Games," available at <https://www.epicgames.com/store/en-US/about>, accessed on August 9, 2021.

<sup>552</sup> Malackowski Report, Section 10.1.

McFadden.<sup>553</sup> Determining whether this would be the case for any particular proposed class developer member, and, thus, whether a proposed class developer member has been harmed on net by Apple's challenged conduct would require understanding all aspects of how the developer generates revenue and individualized inquiry.

343. Determining whether a proposed consumer class member has been impacted by Apple's challenged conduct after accounting for potential licensing fees for Apple's intellectual property, such as Metal, in the but-for world would also require individualized inquiry. Developers that may see a net increase in total royalties paid to Apple (or at least no decline in total fees paid to Apple) for a given app are unlikely to charge a lower price to consumers and may in fact *increase* the consumer price. Whether a consumer paid an overcharge on net, even assuming that all iOS app transaction platforms charge a lower commission rate would require individualized inquiry.

***8.3. Determining whether a developer would change prices in the but-for world, even if it paid a lower commission rate, would require individual inquiry, and individual inquiry would be required to determine impact and damages for each developer and consumer in the proposed classes***

344. In order to determine whether a proposed developer class member was harmed due to Apple's challenged conduct, it is necessary to consider whether a developer would decrease prices of app downloads and in-app purchases in the but-for world. Similarly, in order to determine whether a proposed consumer class member paid an overcharge to Apple, it is necessary to consider whether a developer would decrease prices of app downloads and in-app purchases in the but-for world.

345. Thus, even if an individual developer were to pay a lower commission rate in the but-for world and face lower costs overall (which, as I discussed previously, cannot be assumed), to determine both developer and consumer harm it is necessary to calculate how such lower commission rates affect consumer prices in order to determine impact and damages for proposed class members. Professor Economides and Professor McFadden take different approaches to this requirement. Professor Elhauge does not opine on the pass through of developer commission costs to consumer prices.<sup>554</sup> However, he claims that pass-through is

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<sup>553</sup> Economides Report, Table 7, McFadden Report, ¶ 161 ("I use 10-12 percent as the But-For commission rates."); Elhauge Report, ¶ 349 ("If Apple adjusted its entire commission structure downward in the but-for world, then Apple's commission would necessarily be lower for every transaction in the but-for world than it was in the actual world. This would imply that the challenged conduct harmed every developer in the class on every transaction.").

<sup>554</sup> Elhauge Report, ¶ 64, footnote 61 ("While my market definition analysis accounts for the theoretically [sic] possibility that a developer might pass on a portion of the commission increase to consumers in the form of higher app prices, I offer no opinion on whether in this case there would actually be any such pass through given the economics of this market and

“unlikely,” and thus consumer prices in the but-for worlds are unlikely to change.<sup>555</sup>

Professor McFadden presents a model he states allows him to determine whether, and if so how much, consumer prices would decline in the but-for world in response to his assumed but-for commission rate.<sup>556</sup> Professor Prince discusses the flaws in Professor McFadden’s approach to determining pass-through.<sup>557</sup>

346. Professor Economides, on the other hand, calculates his alleged damages to developers under the assumption that developers do *not* adjust consumer prices in response to his assumed lower commission rate the but-for world. His explanation for this assumption has changed over time. In his report, he claimed that, while developers might choose to lower prices in response to a lower but-for commission rate, this would only happen when the developer felt it could generate even more profits by lowering prices. Thus, from his perspective, while assuming that no developer would change its prices in the but-for world may not be an accurate assumption of but-for pricing, it is a conservative assumption (i.e., “defendant-friendly”) as, by his logic, it would imply lower developer damages.<sup>558</sup> In his deposition, Professor Economides offered a very different opinion, stating that developers would *not* be expected to decrease prices in the but-for world even if they paid a lower commission rate.<sup>559</sup> He provided three reasons for this conclusion in his deposition: (i) developers may not be able to increase quantity if they reduce price; (ii) marginal costs for developers are typically small, which means that developers do not have incentives to reduce

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the fact that apps are typically priced at \$0.99 tiers.”) In his deposition, he stated that “I think that the pass-through issue is not relevant to the existence of harm to the developers in the first place.” Elhauge Deposition, p. 40:13–25. See also, Elhauge Deposition, p. 252:15–19 (“none of my conclusions in my report depend on anything about the pass-through rate.”)

<sup>555</sup> Elhauge Deposition, pp. 41:7–43:15.

<sup>556</sup> McFadden Report, Section VI.

<sup>557</sup> Prince Report, Section 6.

<sup>558</sup> Economides Report, ¶64 (“Assuming their pricing is profit maximizing given the Apple commission at present, basic economics shows us that developers might be able to increase their total revenue by cutting their price in the but-for world and selling more apps. However, conservatively, I calculate damages assuming that developers would not change their prices. To be clear, I am not opining that developers will not have lower prices in the but-for world. I am calculating damages assuming that prices in the but-for world are the same as now, knowing that if in fact prices were lower in the but for world, damages would be higher than the amount I calculated. Thus, I am calculating damages in a conservative, defendant-friendly way.”).

<sup>559</sup> Economides Deposition, pp. 238:22–239:12 (“Q. Are you saying that your measure is conservative because an accurate measure of developers' lost profits would yield even more damages in every case? ... THE DEPONENT: I'm not saying that at all. I mean, I'm saying I have a conservative calculation of -- of damages. Now, is it possible that someone in the but-for world would cut price, it's possible. It's also possible that someone would increase price in the but-for world. But the idea that I can predict that he's going to, let's say, cut price and be successful in selling more, if he would find more people to sell more. That's hard to actually believe.”)

prices in the but-for world; and (iii) if Apple's price tiers were to remain in place in the but-for world, developers that would like to cut prices by less than \$1 would not be able to.<sup>560</sup>

347. Professor Economides' *assumption* that *no* developer will change its prices in the but-for world (i.e., zero pass-through for all developers) is, in fact, neither conservative or supported by fact or analysis. Determining whether lower commission rates and lower overall costs would affect consumer prices requires analyzing multiple factors that will vary across developers and across apps. In reality, the damages for any individual proposed developer class member requires determining whether, and how much, pass-through there is for that individual developer. These are analyses that Professor Economides has not conducted, nor has he offered a common method for how to do so.

348. Similarly, consumer prices for a particular transaction depend on whether there is pass-through on that transaction. The implication of Professor Economides' assumption that no developer would lower its prices in the but-for world is that not a single consumer in the consumer class has in fact been harmed. Available evidence shows that it is true that in some cases, developers do not pass-through decreases in commission rates, resulting in no harm to consumers on those specific transactions. That said, individual inquiry is required to identify for which transactions a developer would pass-through a lower commission rate to consumers such that it can be determined whether, and by how much, any individual proposed developer or consumer class member was impacted by Apple's challenged conduct.

### *8.3.1. Professor Economides' justification for assuming no pass-through in the but-for world is incorrect*

349. In his deposition, Professor Economides offered the opinion that no developer would pass-through any lower commission rates in the but-for world based on his belief that: (i) developers may not be able to increase quantity if they reduce price; (ii) marginal costs for

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<sup>560</sup> Economides Deposition, pp. 239:5–240:10 (“Now, is it possible that someone in the but-for world would cut price, it's possible. It's also possible that someone would increase price in the but-for world. But the idea that I can predict that he's going to, let's say, cut price and be successful in selling more, if he would find more people to sell more. That's hard to actually believe. Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it's zero, or if it's small, the there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world. So taking it one step further, the only possibility that somebody might have to -- to say, oh, you know, I'm going to cut the price a lot, would be if he had a huge marginal cost, which I think is unlikely. And unlikely, very, very very, very unlikely that -- that would be the case. And, again, even in that case, the -- you need some kind of guarantee that you would be able to sell more, which we don't know. Finally, if the 99 cents rule remains in the but-for world, it would be very hard for any developer to cut the price to fit exactly in the next 99 segment. Let's say, from -- from 2.99 to 1.99. It would be very hard to -- to do that. And, therefore, it would be an impediment to changing prices.”); p. 241:12–23 (“Q. ... You agree that you calculate damages assuming that developers would not change their prices, correct? ... THE DEPONENT: Yes. Q. ... And are you testifying now that you believe that assumption is 100 percent accurate as a factual matter? ... THE DEPONENT: Well, I already explained why I think it's a -- it's a very, very, very reasonable assumption.”).

developers are typically small, which means that developers do not have incentives to reduce prices in the but-for world; and (iii) if Apple's price tiers were to remain in place in the but-for world, developers that would like to cut prices by less than \$1 would not be able to.<sup>561</sup> As I now discuss, Professor Economides provides no factual basis for this sweeping opinion.

*8.3.1.1 Professor Economides cannot assume that most developers would not increase revenues if they reduced prices in the but-for world*

350. Professor Economides has offered two contradictory opinions on whether a given developer would find it profitable to pass-through changes in cost, such as a lower commission rate. Professor Economides stated in his report that he can “assum[e] that prices in the but-for world are the same as now” because he claims that “basic economics shows us that developers might be able to increase their total revenue by cutting their price in the but-for world.”<sup>562</sup> He thus concluded that “if in fact prices were lower in the but-for world, damages would be higher than the amount [he] calculated.”<sup>563</sup> In his deposition, however, he concluded that that this was not realistic. He stated it was “hard to actually believe” that he could predict whether a developer would “cut price and be successful in selling more, [and] if he would find more people to sell more” and that it would be a “high hurdle” to show that a developer “will be able to make higher sales at the lower price in the but-for world.”<sup>564</sup> Which of his contradictory opinions is correct for any given developer remains unknown, as whether a developer's revenue would increase in response to an increase in price depends on specifics regarding that developer and its apps, none of which Professor Economides has analyzed.

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<sup>561</sup> Economides Deposition, pp. 239:5–240:10 (“Now, is it possible that someone in the but-for world would cut price, it's possible. It's also possible that someone would increase price in the but-for world. But the idea that I can predict that he's going to, let's say, cut price and be successful in selling more, if he would find more people to sell more. That's hard to actually believe. Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it's zero, or if it's small, there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world. So taking it one step further, the only possibility that somebody might have to -- to say, oh, you know, I'm going to cut the price a lot, would be if he had a huge marginal cost, which I think is unlikely. And unlikely, very, very very, very unlikely that -- that would be the case. And, again, even in that case, the -- you need some kind of guarantee that you would be able to sell more, which we don't know. Finally, if the 99 cents rule remains in the but-for world, it would be very hard for any developer to cut the price to fit exactly in the next 99 segment. Let's say, from -- from 2.99 to 1.99. It would be very hard to -- to do that. And, therefore, it would be an impediment to changing prices.”); p. 241:12–23 (“Q. ... You agree that you calculate damages assuming that developers would not change their prices, correct? ... THE DEPONENT: Yes. Q. ... And are you testifying now that you believe that assumption is 100 percent accurate as a factual matter? ... THE DEPONENT: Well, I already explained why I think it's a -- it's a very, very, very reasonable assumption.”).

<sup>562</sup> Economides Report, ¶ 64.

<sup>563</sup> Economides Report, ¶ 64. In his deposition, Professor Elhauge echoes Professor Economides claim. Elhauge Deposition, pp. 230:2–231:4.

<sup>564</sup> Economides Deposition, pp. 239:5–12, 242:3–14.

351. While a developer *might* be able to increase revenue by reducing price, this is only true under certain conditions. In particular, basic economic logic dictates that firms facing a downward sloping demand curve will generate less revenue per unit sold but also sell more units in response to a decrease in price. Whether that leads to more revenue overall specifically depends on how much quantity changes in response to the decline in price, or how elastic the demand curve is. If the firm is pricing on the elastic part of the demand curve, then the decline in price increases total revenue but if the firm is pricing on the inelastic part of the demand curve, then the decline in price decreases total revenue.<sup>565</sup>

352. Professor Economides has not performed any analysis to determine whether developers would be able to increase sales if they reduced prices. Instead, he simply assumes his conclusion that either developers would not be able to increase sales with lower prices (as he says in his deposition) or developers that would decrease prices in the but-for world would be able to generate more revenue (as he said in his report). For it to be true that developers would only reduce their prices if it meant the developer would earn more revenue, Professor Economides would have to assume that all developers are monopolists that are pricing on the elastic portion of the demand curve. For example, in Figure 3 of his report, Professor Economides provides a graphical representation of supposed damages which depicts the pricing decision of a monopolist app developer that is pricing on the elastic portion of the demand curve.

353. In reality, most app developers are not monopolists and face competition from other entities that offer similar content, whether through an app or in-app content on an iOS device or through other types of content. As one example, consider Named Plaintiff Cameron.<sup>566</sup> He is the developer of the app Lil' Baby Names, which provides consumers with baby naming ideas.<sup>567</sup> Based on a search on the App Store for baby names, there are many other apps on the App Store that provide suggestions for baby names.<sup>568</sup> There are also websites, books,

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<sup>565</sup> David Besanko and Ronald R. Braeutigam, "2.2 Price Elasticity of Demand" in *Microeconomics*, 4th edition, New Jersey: John Wiley & Sons, Inc., 2011, pp. 43–50 ("If the demand is elastic (the quantity demanded is relatively sensitive to price), the quantity reduction will outweigh the benefit of the higher price, and total revenue will fall. If the demand is inelastic (the quantity demanded is relatively insensitive to price), the quantity reduction will not be too severe, and total revenue will go up").

<sup>566</sup> Professor Economides did not analyze whether Named Plaintiff Cameron's app has any competitors. Economides Deposition, 129:16–18 ("Q. Did you examine whether Mr. Cameron has competitors for his app? A. No, I haven't examined.").

<sup>567</sup> Apple App Store, "App Store Preview: Lil' BabyNames," available at <https://apps.apple.com/us/app/lil-babynames/id1015004770>, accessed on July 28, 2021.

<sup>568</sup> See my workpapers. See, for example, Apple App Store, "App Store Preview: Bubtag," available at <https://apps.apple.com/us/app/bubtag/id1229009366?form=MY01SV&OCID=MY01SV>; Apple App Store, "App Store Preview: Name My Kid," available at <https://apps.apple.com/us/app/name-my-kid/id1315240913>.



and other sources for coming up with baby names.<sup>569</sup> Named Plaintiff Cameron therefore likely faces significant competition from other apps as well as from non-apps. He cannot be classified as a monopolist, and more analyses would be needed to determine whether he would generate more revenue if he decreased the price of his app. In deposition, Named Plaintiff Cameron testified that he had previously searched for other baby-naming apps and “they are all competitors.”<sup>570</sup> Named Plaintiff Pure Sweat also competes with many other iOS apps. Based on a search on the App Store, there are at least twenty apps specifically about basketball training that would likely compete with the Pure Sweat app.<sup>571</sup> In deposition, Named Plaintiff Pure Sweat stated that its app competes in the market “for basketball players and coaches that are looking to improve at basketball.” The Named Plaintiff also identified a company called “I’m Possible” as a competitor that competes with Pure Sweat Basketball by producing training and videos.<sup>572</sup> Finally, the developer of the “Down Dog” app, Yoga Buddhi, testified in *Epic v Apple* that his app competes with apps like “Yoga Glow,” “Yoga Studio,” and “Pocket Yoga” (but not with game apps).<sup>573</sup> Given the variation in apps that compete with a given app, a specific study of each app from each proposed developer class

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<sup>569</sup> See my workpapers. See, for example, “BabyNames.com,” available at <http://babynames.com>; Social Security, “Popular Baby Names,” available at <http://www.ssa.gov/oact/babynames/>; Barnes and Noble, “100000+ Baby Names: The Most Helpful, Complete, & Up-to-Date Name Book,” available at <http://www.barnesandnoble.com/w/100000-baby-names-bruce-lansky/1122403152>; Amazon, “The Complete Book of Baby Names: The Most Names (100,001+), Most Unique Names, Most Idea-Generating Lists (600+) and the Most Help to Find the Perfect Name,” available at <http://www.amazon.com/Complete-Book-Baby-Names-Idea-Generating/dp/1402224559>.

<sup>570</sup> Cameron Deposition, pp. 171:13–24, 173:18–174:24. (“Q. So, for example, you’re not saying that your app competes with Uber’s app? A. No. Q. Okay. Are there particular – particular baby name apps that you focus as your competitors, or do you just view baby-naming apps in general as your competitors? A. In 2015, we looked at some baby-naming apps before we undertook the endeavor of building one. And so we did look at some specific ones, but I cannot – I cannot recall which ones those were. ... Q. Have you – have you considered who your competitors at – are at all since 2015? A. Since 2015, on multiple occasions I’ve gone and done searches for little baby – for naming – baby-naming apps. And, you know, it’s like I get different results depending on the year, of course. And they’re – they’re – they’re all competitors. ... Q. Do you view game apps as your competitor? A. No. I mean, from a purely scientific standpoint, you know, all apps are competing for attention. But in – you know, from a market perspective, I don’t view games and other apps as competitors. (...) Q. Your app doesn’t compete with apps like Netflix, right? A. Of course not, no.”).

<sup>571</sup> See my workpapers. See, for example, Apple App Store, “App Store Preview: Basketball Training,” available at <https://apps.apple.com/us/app/basketball-training/id738165126?form=MY01SV&OCID=MY01SV>, Apple App Store, “App Store Preview: Jump Higher – Learn to Dunk,” available at <https://apps.apple.com/us/app/jump-higher-learn-to-dunk/id739500884>.

<sup>572</sup> Pure Sweat Deposition, pp. 255:18–256:1, 258:11–259:2, 264:12–15. (“Q. All right. But just to be clear, as the COO of the company, as we sit here today, you cannot name a single app that competes with your company’s app? A. I mean, I could probably think of one if I sat here long enough – and – and I guess, competes with our app? I like to believe nobody competes with us, but clearly there are other apps out there that do basketball training. ... (...) what companies compete with your company in terms of what your company does? A. There’s a company called ‘I’m Possible’ who does basketball training and videos. Q. Spell that. A. I’m Possible. (...) Q. And – and what do they do? A. They create basketball content in terms of videos and – and online content, that type of thing. Q. Do they have an app? A. I don’t know. I’m not – I’m not aware if they do. ... How would you describe the market in which your app does compete? A. Our market is for basketball players and coaches that are looking to improve at basketball.”).

<sup>573</sup> Epic Trial Testimony, 5/3/21, p. 398. (“Q. Down Dog’s competitors are in the yoga or health or wellness face, right? A. Yes. Q. For example, Down Dog’s yoga app competes with other yoga apps like yoga glow, yoga studio, and pocket yoga, right? A. Correct. Yoga Buddhi’s apps – excuse me. Down Dog’s apps do not compete with gaming apps, right? A. No.”)



member would need to be conducted to determine whether a decline in price would increase or decrease a particular developer's revenues.

*8.3.1.2 Professor Economides cannot assume that every developer has low marginal costs*

354. Professor Economides asserts that marginal costs for developers are typically small, which means that developers do not have incentives to reduce prices in the but-for world.<sup>574</sup> As Professor Willig discusses, developers with zero marginal costs will set prices independent of the commission rate charged by the App Store. A developer with zero marginal costs would therefore not change prices in the but-for world, even if the developer paid a lower commission rate.<sup>575</sup>

355. Thus, while Professor Economides is correct that developers with low marginal costs are unlikely to pass-through lower commission rates, he makes the flawed assumption that every developer has low marginal costs and therefore would not pass-through a lower commission rate. In reality, marginal costs vary across app developers, and individualized inquiry would be required to determine whether a proposed developer class member has low or high marginal costs.

356. Contrary to Professor Economides' assumption, some app developers may face meaningful marginal costs. For example, music streaming apps may face marginal costs for each additional in-app subscription, depending on the royalty arrangement that the developer pays to license music on the app. For example, Professor McFadden acknowledges that music streaming services like Spotify and Pandora have meaningful marginal costs.<sup>576</sup> For these types of developers, Professor Economides' assumption that developers would not pass through lower commission rates because of limited marginal costs would not hold.

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<sup>574</sup> Economides Deposition, pp. 239:13–240:10 (“Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it's zero, or if it's small, there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world. So taking it one step further, the only possibility that somebody might have to -- to say, oh, you know, I'm going to cut the price a lot, would be if he had a huge marginal cost, which I think is unlikely. And unlikely, very, very very, very unlikely that -- that would be the case.”).

<sup>575</sup> Willig Report, Section XI.A. See also Prince Report, Appendix D.

<sup>576</sup> McFadden Report, ¶185 (“A good example of a variable cost faced by certain app developers are the royalty payments paid by music streaming service providers such as Pandora. These royalty payments, paid to the rights-holders of the music offered by the service, can be considered a variable cost because the royalty payments increase as more consumers download and use their app to stream music.”); ¶192 (“I understand that music streaming services pay a significant percentage of their revenues in royalty payments to rights-holders of the music provided to listeners via their app, which are calculated as the larger of a percentage of revenues or a per-user amount (in the case of Spotify), or an amount based on the number of times songs are streamed (in the case of Pandora).”).

357. At the same time, contrary to Professor McFadden’s assumption, many app developers have zero or *de minimis* marginal costs. Professor Prince discusses how the academic literature has found that digital products, such as software, have low marginal costs.<sup>577</sup> For example, a research paper by Lambrecht, et al. (2014) finds that digital products have “near zero marginal cost of production and distribution.”<sup>578</sup>

358. In short, individual inquiry will be required to determine whether a developer has low marginal costs and thus whether it would pass-through any lower commission rate in the but-for world.

*8.3.1.3 Professor Economides cannot assume that 99 cent price tiers would prevent every developer from lowering prices in the but-for world*

359. Professor Economides asserts that the presence of Apple’s 99 cent price tiers would make it difficult for developers to cut prices in the but-for world because developers that would like to cut prices by less than \$1 would not be able to.<sup>579</sup> While this may be true in certain instances, particularly for transactions at lower price points, it is not correct to assume that price tiers would prevent *all* developers from lowering prices in the but-for world if they paid a lower commission rate. For instance, consider a decline in the commission rate from 30 percent to 15.6 percent, one of the but-for commission rates that Professor Economides calculates using his commission rate yardstick.<sup>580</sup> For any app or in-app purchase price that was at least \$6.99 in the actual world, the reduction in the commission rate in this scenario would be at least \$1.<sup>581</sup> Thus, a developer would be able to reduce the price to a lower price tier if the reduction in commissions is fully passed-through. At even higher prices, it would be possible for the reduction in commissions to be only partially passed-through and still choose a lower price tier. In the end, determining whether price tiers would prevent pass-through of any lower commission rates would require analyzing the prices of each developers’ transactions.

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<sup>577</sup> Prince Report, Section 6.5.

<sup>578</sup> Anja Lambrecht et al., “How Do Firms Make Money Selling Digital Goods Online?” *Mark Lett*, 25(3), 2014, pp. 331–341, at p. 333

<sup>579</sup> Economides Deposition, p. 240:4–10 (“Finally, if the 99 cents rule remains in the but-for world, it would be very hard for any developer to cut the price to fit exactly in the next 99 segment. Let’s say, from -- from 2.99 to 1.99. It would be very hard to -- to do that. And, therefore, it would be an impediment to changing prices.”).

<sup>580</sup> Economides Report, Table 7.

<sup>581</sup> This is calculated as  $\$6.99 * (.3 - .156) = \$1.00656$ .

*8.3.2. With pass-through, developer profits will change in different ways in the but-for world, leading to differential damages for proposed developer class members*

360. Even if a developer faced lower transaction prices in the but-for world, the extent to which a developer's profits would be higher but-for Apple's challenged conduct, and therefore the quantum of damages, will depend on the degree to which the developer reduces consumer prices in response. Professor Economides has not attempted to analyze this empirically and cannot assume it would not occur or that it is somehow conservative for all developers to assume that there is no pass-through (i.e., that pass-through would only increase but-for profits). Actual damages to a proposed developer class member cannot be estimated without analyzing pass-through.

361. Pass-through (as well as how pass-through would affect quantity and total revenue) will vary from app to app based on the specific circumstances of the app.<sup>582</sup> Examples demonstrate that while some developers choose to pass-through differences in transaction costs, other developers do not. Comparing the price on the App Store, which would be subject to Apple's commission rate (either 15 or 30 percent), to the price charged outside of the App Store, which would not be subject to Apple's commission rate, can show variation in whether developers pass-through Apple's commission rates to consumers.<sup>583</sup>

362. Some developers have chosen to pass-through Apple's commission rate by charging higher consumer prices. For example, YouTube charges a 30 percent higher price on the App Store for YouTube Red, a 33 percent higher price on the App Store for YouTube Premium, and a 28 percent higher price on the App Store for YouTube Premium Family.<sup>584</sup> This is consistent with YouTube choosing a high level of pass-through the App Store commission rate to consumers through higher prices. Pandora, on the other hand, has chosen to charge a 30 percent higher price for Pandora Premium while charging the same price for its lower tier Pandora Plus service.<sup>585</sup> Tidal charges \$9.99 for TIDAL premium on its website, and \$12.99

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<sup>582</sup> In his deposition, Professor Elhauge states, regarding the circumstances regarding pass-through, "[...] it all depends on the particular profit function in a particular market and the way in which these marginal costs are – you know, are they flat, are they percentage-based, as in this case. Do they have pricing tiers, as in this case." Elhauge Deposition, p. 245. However, as noted previously, he concludes that pass-through is "very unlikely." Elhauge Deposition, p. 40.

<sup>583</sup> Developers likely face costs for transacting directly with consumers. I do not have information on these costs, and to the extent that the costs of transacting directly with consumers outside of the App Store is similar to the commission rate charged by Apple, then developers may charge the same price both on the App Store and when transacting directly.

<sup>584</sup> See my workpapers.

<sup>585</sup> Pandora, "View Plans," available at <https://www.pandora.com/plans>, accessed on August 10, 2021.

in the App Store.<sup>586</sup> Other apps, including Amazon Music<sup>587</sup> and iHeart Radio<sup>588</sup> offer cheaper subscriptions on their websites relative to plans available through apps offered on the App Store. Many other top apps, such as HBO Max and Hulu charge the same price to consumers whether they purchase through the App Store or directly from the developer, indicating no pass-through of Apple's commission rates.<sup>589</sup>

363. For those developers that do pass-through differences in commission rates and transaction costs, individualized inquiry would be required to determine potential damages to those developers, even if it is assumed that they would pay a lower commission rate in the but-for world. Similarly, individualized inquiry would be necessary to determine if those developers that do not currently pass-through differences in commission rates would still choose not to do so in response to an assumed lower but-for commission rate. Ultimately, the decision to pass-through, and if so, the extent of pass-through, a lower commission rate in the but-for world will vary by developer and by app, leading to differential impact of Apple's challenged conduct across developers.

*8.3.3. Prices paid by consumers will change in different ways in the but-for world, leading to differential damages as well as many unharmed proposed consumer class members*

364. Just as damages to proposed developer class members will vary based on how but-for prices change as a result of changes in but-for transaction costs (if any), damages to proposed consumer class members also depend on pass-through. At one extreme, if an app developer does not change consumer prices at all in response to a decrease in cost, then the consumers

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<sup>586</sup> TIDAL, "Subscription Types," available at <https://support.tidal.com/hc/en-us/articles/115003662825-Subscription-Types>, accessed on August 10, 2021; Apple App Store, "App Store Preview: TIDAL Music," available at <https://apps.apple.com/us/app/tidal-music/id913943275>, accessed on August 10, 2021.

<sup>587</sup> Subscribers to Amazon Music pay \$10.99 per month through the App Store but only \$7.99 per month on Amazon Music's website. See Amazon, "Amazon Music Unlimited," available at <https://www.amazon.com/music/unlimited>, accessed on August 6, 2021; Apple, "App Store Preview – Amazon Music: Songs & Podcasts," available at <https://apps.apple.com/us/app/amazon-music-songs-podcasts/id510855668>, accessed on August 6, 2021.

<sup>588</sup> iHeart Plus and iHeart All Access are offered for \$4.99 per month and \$9.99 per month on iHeart.com, but cost \$5.99 per month and \$12.99 per month, respectively, through the App Store. See iHeart, "iHeart," available at <https://www.iheart.com/>, accessed on August, 6, 2021; Apple, "App Store Preview – iHeart: Radio, Music, Podcasts," available at <https://apps.apple.com/us/app/iheart-radio-music-podcasts/id290638154>, accessed on August, 6, 2021.

<sup>589</sup> HBO Max with ads is \$9.99 and HBO Max without ads is \$14.99. See HBO Max, "HBO Max," available at <https://www.hbomax.com>, accessed on August 10, 2021; Apple, "App Store Preview: HBO Max: Stream TV & Movies," available at <https://apps.apple.com/us/app/hbo-max-stream-tv-movies/id971265422>, accessed on August 10, 2021. Hulu with ads is \$5.99 and Hulu without ads is \$11.99. See Hulu, "What are the costs and commitments for Hulu?" available at <https://help.hulu.com/s/article/how-much-does-hulu-cost>, accessed on August 10, 2021; Apple, "App Store Preview: Hulu: Stream movies & TV shows," available at <https://apps.apple.com/us/app/hulu-stream-movies-tv-shows/id376510438>, accessed on August 10, 2021.

that transacted with that developer would not pay a higher price in the actual world compared to the but-for world, and therefore could not be harmed.

365. As discussed previously, empirical evidence demonstrates that while some developers pass-through costs to consumers, other developers would likely not, in fact, pass-through changes in costs to consumers in the but-for world. For instance, Pandora, YouTube, and Tidal all charge a higher price for certain in-app purchases through an iOS app compared to purchases directly from their web site, indicative that they pass-through Apple's commission rate to consumers.<sup>590</sup> Other developers, however, do not charge different prices on the App Store for in-app purchases compared to what those developers charge outside of the App Store, for which they do not pay a commission, such as Hulu or LinkedIn.<sup>591</sup> These developers may therefore be unlikely to pass through a lower commission rate (if any) that was charged by an iOS app transaction platform in the but-for world. Proposed consumer class members that transacted with these developers would therefore not pay a lower price in the but-for world and therefore would not be harmed by Apple's challenged conduct on these transactions. Which developers would, in fact, charge a lower price in the but-for world (assuming they paid a lower commission rates in the but-for world) is a matter of individual inquiry.

366. As discussed earlier, one reason that developers could be unable to charge lower prices in the but-for world is if but-for transaction costs were lower due to pricing policies on the App Store.<sup>592</sup> However, determining whether such pricing policies would prevent developers from passing-through any lower commission rates would require individualized inquiry. As previously discussed, developers are required to choose a price ending in 99 cents, and must set a minimum price of \$0.99 for paid app downloads and in-app purchases.<sup>593</sup> Many other app transaction platforms similarly set price tiers and minimum transaction prices, including platforms that compete with other app transaction platforms for the same device. For instance, the Microsoft Store maintains a minimum price of \$0.99 and requires developers to choose a price from a set of possible price tiers.<sup>594</sup> While Google Play does not require developers to choose a price from a set of possible price tiers, it does set a minimum price of \$0.99, and in practice, most developers choose a price ending in 99.<sup>595</sup> Thus, I would expect

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<sup>590</sup> See ¶ 362.

<sup>591</sup> See ¶ 362.

<sup>592</sup> See Section 8.3.1.3.

<sup>593</sup> See ¶ 64.

<sup>594</sup> Microsoft, "Set and schedule app pricing," October 31, 2018, available at <https://docs.microsoft.com/en-us/windows/uwp/publish/set-and-schedule-app-pricing>.

<sup>595</sup> When setting prices for paid apps on Google Play, developers must adhere to Google's "list of price ranges and currencies allowed by country," which in the United States is United States Dollars and \$0.99–\$400.00. See Google, "Set up your app's prices," available at <https://support.google.com/googleplay/android->

that the App Store would continue to have minimum prices for paid app downloads and in-app purchases in the but-for world. Similarly, I would expect developers would continue to employ focal point pricing in the but-for world, so regardless of whether Apple maintained its price tiers in the but-for world, developers would likely choose prices ending in 99.

367. As recognized by Justice Gorsuch in his dissenting opinion in *Apple v. Pepper*, such focal point pricing and minimum prices limit developers' ability to change prices in response to changes in the commission rate. This is because the change in commission may be too small to make it profitable to move the price to the next price tier, in which case the developer may choose not to modify the price. For example, a developer that would charge \$1.99 absent Apple's commission would not be able to raise the price to \$2.59 even if the developer wanted to fully pass-through Apple's 30 percent commission rate. Instead, the developer would either need to continue to charge \$1.99 or increase the price to \$2.99. Determining which price the developer would choose (i.e., which would make the developer more profitable) in this situation would require individualized inquiry, and hence so would determining whether the consumer would pay a higher price as a result of Apple's commission. In many situations, the developer may continue to set the price at \$1.99, resulting in no harm to consumers as a result of Apple's challenged conduct.

368. The ability of developers to pass-through a lower commission rate to consumers would be especially difficult for developers that charge the minimum price in the but-for world. For these apps and in-app products, developers would not be able to charge lower prices in the but-for world. Consumers that purchased those apps and in-app purchases in the actual world would thus pay the same amount in the but-for world and could not be harmed by Apple's challenged conduct on those purchases.

369. Figure 35 shows the distribution of prices for paid download transactions and Figure 36 shows the distribution of prices for in-app purchase transactions on the App Store. As can be seen, a high proportion of app downloads and in-app purchases occur at \$0.99.

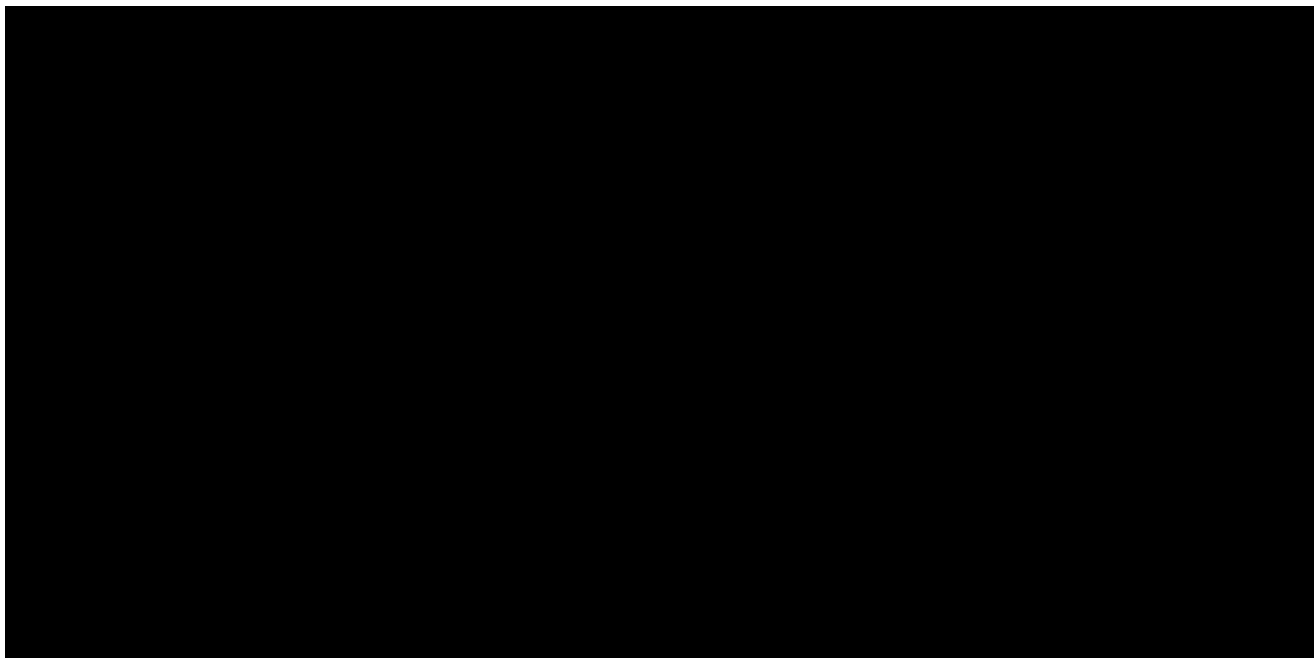
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developer/answer/6334373?hl=en#zippy=%2Cpaid-apps , accessed on August 10, 2021; Google, "Supported locations for distribution to Google Play users," available at [https://support.google.com/googleplay/android-developer/answer/10532353?visit\\_id=637642257467132519-3940867868&rd=1](https://support.google.com/googleplay/android-developer/answer/10532353?visit_id=637642257467132519-3940867868&rd=1), accessed on August 10, 2021. See my workpapers.

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**FIGURE 35**

***Distribution of app download prices greater than zero through the App Store (June 4, 2015 – April 25, 2021)***

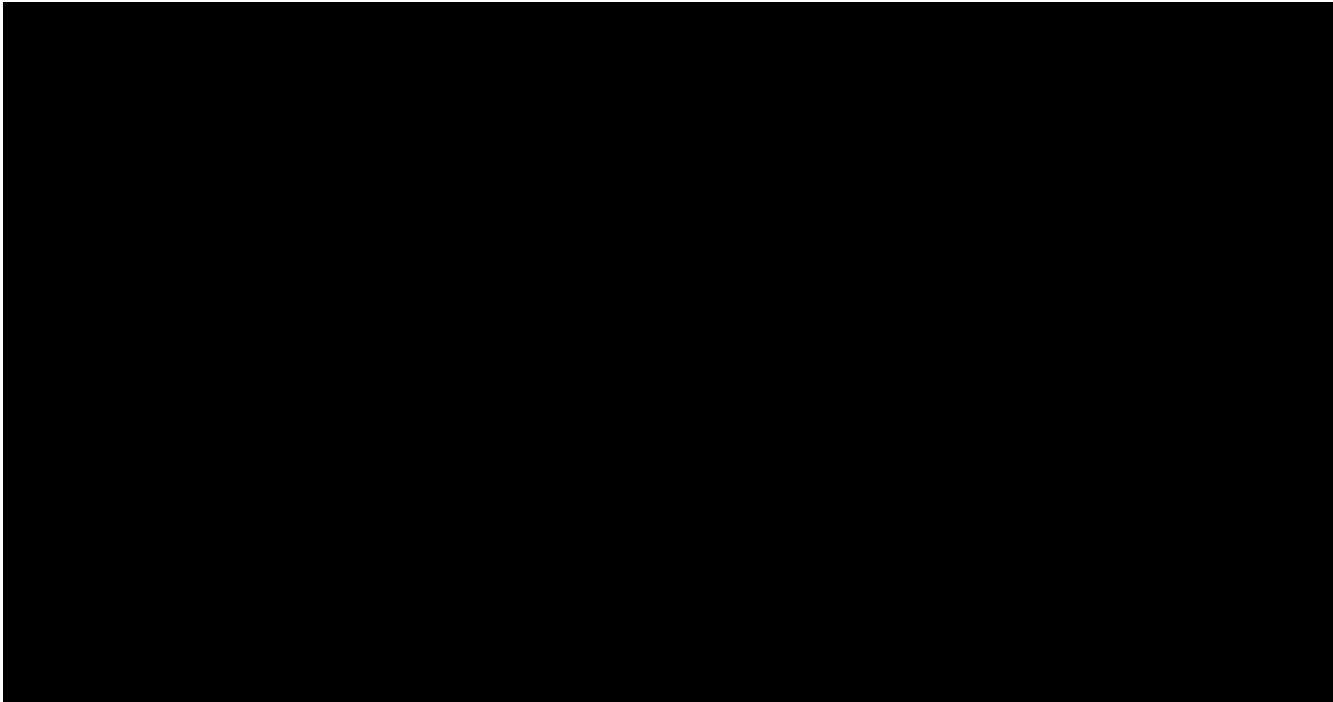


Source: Apple Transaction Data

Note: Only original transactions from downloads are included. Only transactions associated with the developers in the proposed class are included. The analysis is limited to positive app download transactions. Transactions not ending in 0.99 are excluded and account for [REDACTED] transactions with a non-zero price. 28 observations with billing amount greater than \$999.99 are excluded. Each bucket includes the smaller and excludes the larger value. See Appendix F for details regarding Apple transaction data processing.

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**FIGURE 36*****Distribution of in-app purchase prices greater than zero through the App Store (June 4, 2015 – April 25, 2021)***

Source: Apple Transaction Data

Note: Only original transactions from in-app purchases are included. Only transactions associated with developers in the proposed class are included. The analysis is limited to positive in-app purchase transactions. [REDACTED] observations with billing amount equal to \$0.00 are excluded from this analysis. Transactions not ending in 0.99 are excluded and account for [REDACTED] of transactions with a non-zero price. See Appendix F for details regarding Apple transaction data processing.

370. In fact, many proposed consumer class accounts only transacted at the minimum price across all paid transactions for the account. I find that [REDACTED] of proposed consumer class accounts only made paid download transactions at \$0.99 and [REDACTED] of proposed consumer class accounts only made in-app purchase transactions at \$0.99. Combined, [REDACTED] of proposed consumer class accounts only made paid transactions on the App Store at the minimum price.<sup>596</sup> Since these proposed consumer class accounts would not have paid lower prices at all in the but-for world if Apple maintained its minimum price, these consumers would all be unharmed by Apple's challenged conduct if Apple maintained its tier-based pricing (as observed across many app transaction platforms) in the but-for world.

<sup>596</sup> See my workpapers. In some instances, developers charge a price of \$0.49 for in-app purchases.

## **9. PROFESSOR ECONOMIDES' DAMAGES METHODOLOGY IS UNRELIABLE AND CANNOT BE USED TO DETERMINE CLASSWIDE DAMAGES OR DAMAGES TO AN INDIVIDUAL DEVELOPER IN THE PROPOSED CLASS**

371. Professor Economides asserts that “[d]amages for each plaintiff equal each commission rate they paid in the actual world, minus the but-for commission rate, times their total sales at each rate.”<sup>597</sup> He ultimately concludes that total damages to class members are between [REDACTED] and [REDACTED].<sup>598</sup> However, Professor Economides’ damages methodology suffers from a large number of fundamental flaws and errors that make his analysis incapable of calculating classwide damages or damages to any individual developer in the proposed class.

### ***9.1. Professor Economides’ yardstick damages methodologies uses inappropriate benchmarks***

372. In Section 6.2.1, I discussed why Professor Economides’ but-for commission rates are inappropriate for determining common impact for all proposed class members. Professor Economides’ assumed but-for commission rates are also inappropriate for calculating classwide damages or damages for any individual proposed developer class members. These flaws include:

- Professor Economides assumes that the but-for commission rates would equal one of two commission rates that would be the same on all potential iOS app transaction platforms and for all app developers and all apps, despite evidence from the actual world that app transaction platforms vary in the commission rates charged and that app transaction platforms charge different commission rates depending on specifics of each transaction.<sup>599</sup>
- Professor Economides assumes that the but-for commission rates based on his commission rate yardstick approach would be based on benchmark PC app transaction platforms, ignoring all other app transaction platforms, including platforms that charge the same headline commission rates as those currently charged by the App Store.<sup>600</sup>
- Professor Economides assumes that the but-for commission rates based on his commission rate yardstick approach throughout the entire developer class period

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<sup>597</sup> Economides Report, ¶ 63.

<sup>598</sup> Economides Report, Table 9, ¶ 76 (“Together, my estimate of total damages ranges from \$2.945 billion to \$3.356 billion.”). These damages estimates were calculated based on data through September 30, 2019.”)

<sup>599</sup> See Section 6.2.1.4.

<sup>600</sup> See Section 6.2.1.3.

would be equal to commission rates charged by PC app transactions in 2019, ignoring changes in commission rates on PC app transactions over time.<sup>601</sup>

- Professor Economides' assumed but-for commission rates based on his commission rate yardstick approach is based on estimated costs of direct distribution by five PC app developers even though the commission rates charged on PC app transaction platforms already reflect competition with direct distribution.<sup>602</sup> These estimated costs of direct distribution are also fundamentally flawed as well since they are entirely based on Epic's costs from the Epic Games Store.<sup>603</sup>
- Professor Economides' assumed but-for commission rates based on his rival profit yardstick approach is determined by assuming that potential entrants would earn the same profit margin as those earned by Alibaba and eBay, neither of which are app transaction platform or generally comparable to the App Store.<sup>604</sup>
- Professor Economides' assumed but-for commission rates based on his rival profit yardstick approach is determined by assuming that entering iOS app transaction platforms would achieve an unrealistic market share that is inconsistent with the market shares of actual entrants like the Epic Games Store.<sup>605</sup>
- Professor Economides' assumed but-for commission rates are based on an inappropriate assumption that the App Store would set two commission rate tiers, resulting in commission rates that are even further below the commission rates charged by other app transaction platforms in the real world.<sup>606</sup>
- Professor Economides assumed zero pass through for every developer, app and in-app purchase.<sup>607</sup>

373. Beyond these conceptual flaws with Professor Economides' benchmark commission rates, Professor Economides' damages methodology suffers from numerous other flaws, errors, and inconsistencies that further undermine its reliability for estimating damages to proposed developer class members. I discuss these problems in the next sections.

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<sup>601</sup> See Section 6.2.1.3.

<sup>602</sup> See Section 6.2.1.5.

<sup>603</sup> See Section 6.2.1.5.

<sup>604</sup> See Section 6.2.1.6.

<sup>605</sup> See Section 6.2.1.6.

<sup>606</sup> See Section 6.2.1.7.

<sup>607</sup> See Section 8.3.1.

***9.2. Professor Economides’ yardstick commission damages methodology is not based on data on actual commission rates for PC app transaction platforms or actual costs of direct distribution***

374. Professor Economides’ yardstick commission damages methodology is flawed and unreliable because he calculates “commission rates” for seven of his eight PC app transaction platforms and direct distribution “stores” using unsupported assumptions and second-hand estimates rather than basing the rates on actual transactions.

375. As I discussed in Section 6.2.1.5, rather than using actual costs of direct distribution, Professor Economides applies Epic Games Store’s cost structure to each of the five direct distribution “stores” in his analysis, which is conceptually flawed. In addition, the internal Epic document that Professor Economides relies upon does not appear to show costs associated with Epic distributing its own games through the Epic Games Store. Instead, the document appears to show the costs of running the Epic Games Store in order to provide third-party game transactions.<sup>608</sup> This document is therefore unable to show the cost of direct distribution, even for Epic.

376. Furthermore, Professor Economides makes adjustments to the 2019 costs for the Epic Games Store reported in the document, choosing to use marketing costs as a percent of sales from 2020 instead of using the same number from 2019.<sup>609</sup> However, the document assumed dramatically reduced marketing costs as a percent of sales in 2020 and beyond. Had Professor Economides instead used the 2019 cost figures, he would conclude that the variable cost for direct distribution is [REDACTED], which would lead to a significantly higher average effective “commission rate” and lower aggregate damages.<sup>610</sup>

377. For the third-party app transaction platforms, Professor Economides approximates the average commission rate for two of the three platforms.<sup>611</sup> For example, Professor Economides simply assumes, without evidence, that all third-party transactions on the Epic

<sup>608</sup> In particular, the P&L that Professor Economides cites to indicates that Epic it would pay an 88 percent royalty for all forecasted revenues generated on the Epic Games Store in each year except for the first year of the store, which provides strong evidence that this document is only capturing revenues from transactions for third-party games. See EGS Performance and Strategy Review at EPIC\_00127293.

<sup>609</sup> EGS Performance and Strategy Review at EPIC\_00127293; Economides Report Backup, “Economides Rate Yardstick.xlsx.”

<sup>610</sup> EGS Performance and Strategy Review at EPIC\_00127293. Variable costs would be [REDACTED] for marketing, [REDACTED] of sales for payment processing, [REDACTED] for payment processing, and [REDACTED] for people. See Economides Report Backup, “Economides Rate Yardstick.xlsx.”

<sup>611</sup> The only app transaction platform for which Professor Economides actually calculates the effective commission rate based on sales and commission data is Steam. See Economides Report Backup, “Economides Rate Yardstick.xlsx.”

Games Store have a commission rate equal to 12 percent.<sup>612</sup> However, as I discussed earlier, Epic has negotiated individual contract terms with certain app developers, so it is incorrect to assume that the average effective commission rate on the Epic Games Store is 12 percent.<sup>613</sup> Similarly, he determines Microsoft Store's commission rate using a back-of-the-envelope calculation based on approximate numbers in an internal Microsoft presentation.<sup>614</sup> Professor Economides provides no evidence that customers actually pay these commission rates in practice.

378. Finally, Professor Economides' sales figures for each non-Microsoft PC app transaction platform and direct distribution "store" come from a single Microsoft internal presentation.<sup>615</sup> These are estimates compiled from various public data sources, and Professor Economides acknowledged in his deposition that he was unfamiliar with how the presentation was prepared.<sup>616</sup> Professor Economides has likewise performed no analysis to determine whether the sales figures are comparable across companies or whether the estimates sales accurately reflect total 2019 transaction volume on each PC app transaction platform or "store." The unreliability of this presentation in estimating total sales is highlighted by the fact that Professor Economides uses the total sales figures from this presentation as estimates for the direct sales by EA and Activision Blizzard through their storefronts even though both developers also transact through other third-party app transaction platforms.<sup>617</sup> The estimates in the Microsoft presentation would therefore overestimate the level of sales for these developers directly to consumers, making the estimates unreliable.

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<sup>612</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx."

<sup>613</sup> See Section 5.5.2.5. Epic Games Store has also negotiated non-monetary terms, such as exclusivity, with some developers. Although these terms may not directly affect the average effective commission rate, they would still impose costs on developers that Professor Economides fails to take into account.

<sup>614</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx." See also Project Brazil Presentation, slides 9–10. Professor Economides uses several numbers from the presentation regarding sales by category and the proportion of sales at different commission rates within each category to estimate total sales and the average effective commission rate on the Microsoft Store for PC.

<sup>615</sup> Microsoft Profit Presentation, slides 44–48.

<sup>616</sup> Economides Deposition, pp. 181:17–182:9.

<sup>617</sup> EA also transacts through Steam. For example, the EA game Star Wars Jedi: Fallen Order is available on Steam. See EA, "Get Star Wars Jedi: Fallen Order," available at <https://www.ea.com/games/starwars/jedi-fallen-order/buy>, accessed on August 7, 2021; Steam, "Star Wars Jedi: Fallen Order," available at [https://store.steampowered.com/app/1172380/STAR\\_WARS\\_Jedi\\_Fallen\\_Order/](https://store.steampowered.com/app/1172380/STAR_WARS_Jedi_Fallen_Order/). Activision Blizzard also offers games on Steam, such as Sekiro: Shadows Die Twice. See Steam, "Sekiro: Shadows Die Twice," available at [https://store.steampowered.com/app/814380/Sekiro\\_Shadows\\_Die\\_Twice\\_GOTY\\_Edition/](https://store.steampowered.com/app/814380/Sekiro_Shadows_Die_Twice_GOTY_Edition/). Both games additionally transact on console platforms, such as Xbox and Playstation. See From Software, "Sekiro: Shadows Die Twice," available at <https://www.fromsoftware.jp/ww/>, accessed on August 7, 2021.

***9.3. Professor Economides' yardstick commission damages methodology calculations contain multiple inconsistencies and errors, and correcting these basic errors results in a higher average effective commission rate and lower aggregate damages***

379. Professor Economides' yardstick commission damages calculation contain multiple unexplained data inconsistencies and errors that make his analysis unreliable.

380. First, Professor Economides yardstick commission damages calculations are inconsistent with his stated approach. He purports to be limiting his benchmark analyses to the "Windows PC app distribution market" and not the "Mac OS app distribution market," which he confirmed in his deposition.<sup>618</sup> However, the app transaction platforms he analyses also offer macOS app transactions, and he makes no attempt to distinguish sales on these platforms for Windows PC apps from macOS apps.<sup>619</sup> He also purports to be limiting his benchmark analyses to the U.S. market.<sup>620</sup> However, the app transactions platforms he includes as benchmarks all operate outside of the U.S., including WeGame by Tencent, which operates almost entirely in China and, as previously discussed, has an outsized impact on his calculated average effective commission rate.<sup>621</sup> Professor Economides makes no attempt to distinguish sales on these platforms between the U.S. and the rest of the world; in fact, he stated in deposition that if there were sales outside of the U.S. included in his analyses, he would have to adjust his analysis.<sup>622</sup>

381. Second, Professor Economides calculates an average effective commission rate of [REDACTED] percent for third-party transactions on Steam.<sup>623</sup> This is calculated based on data sets

<sup>618</sup> Economides Report, ¶¶ 35–37; Economides Deposition, p. 103:14–17 ("Q. Do you include, in the PC app distribution market, apps that are distributed by platforms on the Mac? A. No.").

<sup>619</sup> See, for example, Epic Games, "Epic Games Store FAQs | Get Answers to Your Frequent Questions," available at <https://www.epicgames.com/site/en-US/epic-games-store-faq> ("The Epic Games Store currently offers PC and Mac support."); Steam, "macOS on Steam," available at <https://store.steampowered.com/macOS>, accessed on August 10, 2021.

<sup>620</sup> Economides Deposition, p. 146 ("A. I believe my -- my yardstick is the -- in the PCs is for the U.S. market. Q. That's your intent, correct? A. I believe so, yeah.").

<sup>621</sup> See Section 6.2.1.1. See also Economides Deposition, p. 187:4–18 ("Q. Is your yardstick, based on table 4, limited to U.S. developer sales to U.S. Windows users? A. I believe so. ... Q. No, I'm asking about your yardstick in table 4. A. Oh, I see. No. I mean, it includes some foreign firms too."); pp. 188:20–189:5 ("Q. Okay. Do you know if the sales that you report for Blizzard are all sales on its U.S. storefront? A. I think so, but I'm not completely sure. ... Q. And do you believe all the Steam numbers are for U.S. sales? A. I believe so.") Tencent launched WeGame X outside of China in April 2019, however, at launch the platform had relatively few games. Jody Macgregor, "Tencent launches its WeGame client outside China," *PC Gamer*, April 7, 2019, available at <https://www.pcgamer.com/tencent-have-launched-their-wegame-client-outside-china/>, accessed on August 9, 2021.

<sup>622</sup> Economides Deposition, p. 189:6–13 ('Q. Okay. And if they aren't, you would want to adjust the figure to reflect just U.S. sales, correct? ... THE DEPONENT: Well if -- if there aren't, then we have to adjust, yes, that's -- that's -- that's correct, if we're looking for a Windows PC stores measure that is just U.S.').

<sup>623</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx." Table 4 in Professor Economides appears to contain a rounding or data entry error since he reports an average effective commission rate for third-party transactions on Steam of [REDACTED]. See Economides Report, Table 4.

produced by Epic in this matter showing total billings and total commissions by year and app product.<sup>624</sup> This data set, however, does not contain all third-party apps transacted on Steam. I understand that these data were produced in response to a discovery order in the *Apple v. Epic* case, which required Steam to produce data on 436 games transacted on Steam. These data are thus only a fraction of the apps transacted through Steam.<sup>625</sup> The incompleteness of these data leads to an inconsistency between the total sales of third-party apps on Steam reported by Microsoft in the presentation that Professor Economides relies upon (showing approximately [REDACTED] in total sales in 2019) and the total sales as calculated by Professor Economides (showing [REDACTED] in sales in 2019).<sup>626</sup> There is a further inconsistency between the [REDACTED] commission rate that Professor Economides calculates for third-party transactions on Steam and the footnote in the Microsoft presentation, which indicates a commission rate of [REDACTED].<sup>627</sup> While Professor Economides claimed in his deposition that the numbers he used from the Microsoft presentation were accurate and consistent with his backup, he could not explain these discrepancies.<sup>628</sup>

382. Third, Professor Economides inconsistently relies on sales figures from the Microsoft presentation, so the sales figures he uses are not comparable. In particular, the Microsoft presentation typically reports two sales amounts for each platform or developer: “reported revenues” and “adjusted revenues.”<sup>629</sup> In addition to other differences between the two types of sales figures, the reported revenue generally appear to be gross sales that include any relevant commissions while the adjusted revenue are net sales excluding commissions.<sup>630</sup> Professor Economides does not state which figure he intended to include in his sales analysis, and his analysis is based on different types of revenue for different companies. He uses

<sup>624</sup> Valve Document, undated, VALVE 001393 – 522; Valve Document, undated, VALVE 001523 – 4. See also Economides Report Backup, Valve-002.xlsx and Valve-003.xlsx.

<sup>625</sup> Valve Discovery Order *Donald R. Cameron, et al., v. Apple Inc.*, February 24, 2021 (“As for the data sought by RFP 2 on a per-app basis, the Court narrows RFP 2 and orders Valve to produce the per-app information only for the 436 apps available on both Steam and the Epic Games store (as providing that information broken down for all 30,000+ apps is an unnecessary burden on Valve), and to produce that within 30 days.”). For example, the top sellers on Steam as of April 1, 2021 included games like *Evil Genius 2*, *It Takes Two*, *Valheim*, and *Counter Strike: Global Offensive*. These games were not included in Professor Economides’ analysis. Steam, “Top Sellers,” available at <https://web.archive.org/web/20210401152402/https://store.steampowered.com/search/?filter=topsellers>, accessed on August 10, 2021.; Valve Document, undated, VALVE 001393 – 522; Valve Document, undated, VALVE 001523 – 4. See also Economides Report Backup, Valve-002.xlsx and Valve-003.xlsx.

<sup>626</sup> Microsoft Profit Presentation, slide 45; Economides Report Backup, Economides Rate Yardstick.xlsx,” and “Valve Steam Store Effective Rates.xlsx.”

<sup>627</sup> Microsoft Profit Presentation, slide 45 (“[A]djusted revenue deducts the estimated 73% share paid to publishers from Valve’s 3P digital store”). See also Economides Report Backup, “Economides Rate Yardstick.xlsx.”

<sup>628</sup> Economides Deposition, pp. 194:19–201:17.

<sup>629</sup> See, for example, Microsoft Profit Presentation, slide 46.

<sup>630</sup> See, for example, Microsoft Profit Presentation, slide 46 (“Adjusted revenue reflects YoY change in deferred revenue and mobile platform fees.”).



reported revenues for Valve (both first-party and third-party sales), Epic (both first-party and third-party sales), and Activision Blizzard, while he uses adjusted revenues for EA and Tencent.<sup>631</sup>

383. Fourth, while Professor Economides is attempting to calculate the effective commission rate for PC platforms for 2019, he frequently uses data that appear to be from 2018. He uses a 2018 figure for Epic's revenue from direct distribution even though the Microsoft presentation he relies upon has a 2019 figure on the same slide.<sup>632</sup> Epic's 2018 revenue from direct distribution [REDACTED] was more than two times its 2019 revenue from direct distribution [REDACTED], so using the 2018 figure over-weights Epic's "commission rate" for direct distribution in the average effective commission rate calculation.<sup>633</sup> In addition, the data for EA in the Microsoft presentation he relied upon appear to be for 2018 rather than 2019.<sup>634</sup> Finally, the document that Professor Economides uses to determine the effective commission rate and sales on the Microsoft Store for PC also reports FY2018 revenue rather than revenue for 2019.<sup>635</sup>

384. Fifth, Professor Economides underestimates Microsoft Store's average effective commission rate due to a data entry error. His calculation of the Microsoft Store's effective commission rate is based on a document that reports revenues to Microsoft from the Microsoft Store for three categories of PC apps: games, productivity, and entertainment.<sup>636</sup> For the productivity category, Professor Economides enters a total of \$24 million in sales in his spreadsheet, whereas the source document indicates \$21 million in sales.<sup>637</sup> Because Professor Economides assumed that these extra \$3 million in sales occurred at a 15 percent commission rate, this mistake reduces Microsoft Store's average effective commission rate in Professor Economides' calculation.<sup>638</sup> Using the correct number causes the estimated average effective commission rate for the Microsoft Store to go from 28.5 percent to 28.9 percent.<sup>639</sup>

<sup>631</sup> See, for example, Microsoft Profit Presentation, slides 44–48. The reported revenues and adjusted revenues for first-party game distribution are the same for Valve. See also Economides Report Backup, "Economides Rate Yardstick.xlsx."

<sup>632</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx"; Microsoft Profit Presentation, slide 48.

<sup>633</sup> Microsoft Profit Presentation, slide 48. The source used by Professor Economides does not provide an explanation for the decline in Epic's revenues from 2018 to 2019.

<sup>634</sup> The footnote to the presentation states that "[a]djustment is intended to better align reported revenue with actual **CY18** consumer spend." Microsoft Profit Presentation, slide 48 (*emphasis added*).

<sup>635</sup> Project Brazil Presentation, slide 10. Professor Economides filed an errata indicating that he used the Microsoft Store's 2018 revenue because 2019 data were not available.

<sup>636</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx"; Project Brazil Presentation, slide 10.

<sup>637</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx"; Project Brazil Presentation, slides 9–10.

<sup>638</sup> Economides Report Backup, "Economides Rate Yardstick.xlsx."

<sup>639</sup> See my workpapers.

385. Sixth, Professor Economides contradicts his own flawed methodology by inexplicably not including fixed costs when calculating direct distribution costs for Valve. He provides no justification for this assumption despite the fact that he assumes Epic, which also distributes its own games as well as third-party games, does incur these costs. Excluding fixed costs from the calculation of Valve's costs artificially reduces Valve's direct distribution costs as a percent of revenues, which in turn reduces Professor Economides' calculated average effective commission rate.

386. Finally, when calculating how many transactions would occur at each commission rate tier in his but-for world, Professor Economides overstates the share of transactions subject to a 30 percent "tier 1" rate rather than a 15 percent "tier 2" rate in the real world by calculating this share based on *all* paid transactions in the Apple Transaction Data, including transactions that were not made by proposed developer class members.<sup>640</sup> Considering only transactions involving developer class members lowers the share of tier 1 transactions from [REDACTED] [REDACTED] this lower share is consistent with the revenue figures in Professor Economides' Table 9.<sup>641</sup>

387. Many of the inconsistencies and errors in Professor Economides' calculations cannot be corrected due to lack of data. However, correcting the four errors I can fix (using 2019 revenues for Epic Games Store, correcting the effective commission rate for the Microsoft Store, including fixed costs in Valve's self-distribution cost calculation, and using the correct ratio of tier 1 to tier 2 transactions) increases Professor Economides' average effective commission rate from [REDACTED].<sup>642</sup> This in turn reduces aggregate damages using his yardstick commission rate method from a range of [REDACTED] [REDACTED].<sup>643</sup>

***9.4. Removing Professor Economides' inappropriate benchmarks from his yardstick commission damages method results in a higher average effective commission rate and lower aggregate damages***

388. As previously discussed, Professor Economides includes direct distribution "stores" in his commission rate yardstick calculation, which is conceptually flawed.<sup>644</sup> These "stores" have lower estimated "commission rates" compared to actual PC app transaction platform.

<sup>640</sup> Economides Report Backup, "Economides Damages Calculations.xlsx."

<sup>641</sup> See my workpapers. See also Economides Report, Table 9.

<sup>642</sup> See my workpapers.

<sup>643</sup> See my workpapers.

<sup>644</sup> See 6.2.1.5.

These “stores” also generate significant revenue, so they are heavily weighted in Professor Economides’ calculation.<sup>645</sup>

389. Direct distribution “stores” represent five of the eight entries in his average effective commission rate calculate and represent [REDACTED] of total revenue across the eight entries.<sup>646</sup> In addition, the purported “commission rates” for these “stores” are lower than the PC app transaction platforms Professor Economides analyzes.<sup>647</sup> Recognizing that the cost of direct distribution should not be included in the effective commission rate analyses and removing these inappropriate benchmarks from Professor Economides’ calculation while making no other changes increases the average effective commission rate using his yardstick commission rate method from [REDACTED]<sup>648</sup> This would imply that all developers, except those that would choose to direct distribute, would pay a but-for commission rate of [REDACTED] and the set of developers who might pay less through direct distribution (if any) would need to be identified through individual inquiry, as previously discussed.<sup>649</sup> Were all developers to transact through an app transaction platform, this would reduce aggregate damages using his yardstick commission rate method to a range of [REDACTED]<sup>650</sup>

390. One PC app direct distribution “store,” Tencent, is particularly inappropriate to include because it operates almost entirely in China.<sup>651</sup> Since Professor Economides has defined his market to be limited to U.S. developers, it is not appropriate to include Tencent in his calculation since it is not a relevant benchmark for the commission rates that proposed developer class members would pay in the but-for world.<sup>652</sup> In addition, as Professor Economides points out when discussing why he did not choose the Chinese Android app transaction market as a benchmark, the Chinese market is fragmented and highly regulated, making its developers poor benchmarks for comparison with U.S. developers.<sup>653</sup> Removing

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<sup>645</sup> See Economides Report, Table 4.

<sup>646</sup> See my workpapers.

<sup>647</sup> See Economides Report, Table 4.

<sup>648</sup> See my workpapers.

<sup>649</sup> See Section 8.1.3.

<sup>650</sup> See my workpapers.

<sup>651</sup> Tencent launched WeGame X outside of China in April 2019, however, at launch the platform had relatively few games. Jody Macgregor, “Tencent launches its WeGame client outside China,” *PC Gamer*, April 7, 2019, available at <https://www.pcgamer.com/tencent-have-launched-their-wegame-client-outside-china/>, accessed on August 9, 2021.

<sup>652</sup> More generally, Professor Economides has not attempted to isolate U.S. developers’ billings and commission rates for each PC app transaction platform or direct distribution “store” from what appear to be billings and commission rates based on worldwide data. Professor Economides has not established that the effective commission rate that he calculates for PC app transaction platforms and direct distribution “stores” is the same as the effective commission rate specifically for U.S. developers.

<sup>653</sup> Economides Report, ¶ 34.

just Tencent from the calculation, while continuing to include other direct distribution “stores,” by itself increases the average effective commission rate using his yardstick commission rate method from [REDACTED] and reduces aggregate damages using his yardstick commission rate method to a range of [REDACTED].<sup>654</sup>

***9.5. Professor Economides’ rival profit yardstick damages methodology is fundamentally flawed***

391. As I discussed in Section 6.2.1.6, Professor Economides’ rival profit yardstick damages methodology is unreliable because it makes unsupported and flawed assumptions and generates nonsensical results.

- Professor Economides’ assumed entrant market share in his one-entrant scenario is based on an Epic Games Store planning document predicting market shares that Epic never in fact achieved. His assumed entrant market shares in his two-entrant scenario are further “extrapolated” from this single data point with no basis. These market share assumptions are unreliable, and when they are updated to more closely reflect the share Epic Games Store has achieved in reality, Professor Economides’ model predicts a *higher* commission rate on the App Store in the but-for world compared to the real world.<sup>655</sup>
- Professor Economides’ assumption that Apple and any hypothetical entrants would charge the same effective commission rate in the but-for world is invalidated by his own data from his commission rate yardstick model, which shows that different PC app transaction platforms charge vastly different commission rates.<sup>656</sup>
- Professor Economides’ assumed profit margins for entering iOS app transaction platforms is based on the profit margins of benchmark companies which are not app transaction platforms. These benchmark companies cannot be used to determine the profit margin of hypothetical entrants, making his method unreliable.<sup>657</sup>

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<sup>654</sup> See my workpapers.

<sup>655</sup> See Section 6.2.1.6.

<sup>656</sup> See Section 6.2.1.6.

<sup>657</sup> See Section 6.2.1.6.

*I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.*

*Executed on August 10, 2020.*

A handwritten signature in dark ink, appearing to read "Lorin M. Hitt", is written over a light gray rectangular background.

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Lorin M. Hitt

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**Educational History**

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### Articles Published in Refereed Journals

1. Chen, Pei-Yu, Hitt, Lorin M., Wong, Yili and Shin-Yi Wu (forthcoming). "Measuring Product Type and Purchase Uncertainty with Online Product Ratings: A Theoretical Model and Empirical Application," *Information Systems Research* (a previous version appeared as Hong, Yili, Chen, Pei-Yu, and Lorin M. Hitt (2012). "Measuring Product Type with Dynamics of Online Review Variance: Implications for Research and Practice," *Proceedings of the 31<sup>st</sup> Annual International Conference on Information Systems* [runner-up best paper award]).
2. Wu, Lynn, Hitt, Lorin M. and Bowen Lou (2020). "Data Analytics Skills, Innovation and Firm Productivity," *Management Science* 66(5): 1783-2290.
3. Wu, Lynn, Hitt, Lorin M. and Bowen Lou (2019). "Data Analytics Supports Decentralized Innovation Communities," *Management Science* 65(10): 4451-4949.
4. Bavafa, Hessam and Hitt, Lorin M. and Terwiesch, Christian (2018), "The Impact of E-Visits on Visit Frequencies and Patient Health: Evidence from Primary Care," *Management Science* 64(12): 5461-5959.
5. Tan, Fangyun, Netessine, Sergei and Lorin M. Hitt (2017). "Is Tom Cruise Threatened? An Empirical Study of the Impact of Product Variety on Demand Concentration," *Information Systems Research* 28(3): 643-660.
6. Avgar, Ariel, Tambe, Prasanna and Lorin M. Hitt (2018). "Built to Learn: How Work Practices Affect Employee Learning During Healthcare Information Technology Implementation," *MIS Quarterly* 42(2): 645-659 (a previous version appeared as "The Effects of Organizational Factors on Healthcare IT Adoption Costs: Evidence from New York Nursing Homes," *Proceedings of the 2009 Hawaii International Conference on Systems Sciences: HICSS-43.*).
7. Wu, Lynn, Jin, Fujie and Lorin M. Hitt (2018). "Are All Spillovers Created Equal? A Network Perspective on IT Labor Movement," *Management Science* 64(7): 2973-3468. (A previous version appeared as: Wu, Lynn, Jin, Fujie and Lorin M. Hitt (2014). "Are All



Spillovers Created Equal? A Network Perspective on IT Labor Movements,” *Proceedings of the 33<sup>rd</sup> Annual International Conference on Information Systems*.)

8. Hitt, Lorin M. and Prasanna Tambe (2016). “Health Care Information Technology, Work Organization and Nursing Home Performance,” *ILR Review* (69): 834-859.
9. Tambe, Prasanna and Lorin M. Hitt (2014). “Measuring Information Technology Spillovers,” *Information Systems Research* 25(1):53-71. (A previous version appeared as: Hitt, Lorin M. and Sonny Tambe (2006). “Measuring Spillovers from Information Technology Investments,” *Proceedings of the 25<sup>th</sup> Annual International Conference on Information Systems*)
10. Tambe, Prasanna and Lorin M. Hitt (2014). “Job Hopping, Information Technology Spillovers and Productivity Growth,” *Management Science* 60(2): 338-355. (A previous version appeared as: Tambe, Sonny and Lorin M. Hitt (2010). “Job Hopping, Knowledge Spillovers, and Regional Returns to Information Technology Investments,” *Proceedings of the 29<sup>th</sup> Annual International Conference on Information Systems*.) (Finalist, Management Science Best Paper Award IS Area, 2015; Winner Management Science Best Paper Award IS Area, 2016).
11. Wu, D.J., Ding, Ming, and Lorin M. Hitt (2013). “IT Implementation Contract Design: Analytical and Experimental Investigation of IT Value, Learning and Contract Structure,” *Information Systems Research* 24(3). 787-801 (A previous version appeared as: Wu, D.J., Ding, Min and Lorin M. Hitt (2003). “Learning in ERP Contracting: A Principal-Agent Analysis,” *Proceedings of the 37<sup>th</sup> Annual Hawaii International Conference on System Sciences*, Honolulu, HI.)
12. Gao, Gordon and Lorin M. Hitt (2012) “IT and Trademarks: Implications for Product Variety” *Management Science* 58(6): 1211-1226. [A previous version appeared as: Gao, Gordon and Lorin M. Hitt (2004). “IT and Product Variety: Evidence from Panel Data,” *Proceedings of the 25<sup>th</sup> Annual International Conference on Information Systems*, Washington, D.C. (Runner-up – Best Paper Award)]
13. Tambe, Prasanna and Lorin M. Hitt (2012). “Information Technology and Productivity 1987-2006: Evidence from New Firm-Level Data,” *Information Systems Research* 23(9):599-617. (Winner of the ISR 2013 Best Paper Award).
14. Field, Joy, Xue, Mei and Lorin M. Hitt (2012) “Learning by customers as co-producers in financial services: An empirical study of the effects of learning channels and customer characteristics,” *Operations Management Research* 4(1-2), June: 43-56.
15. Tambe, Prasanna and Lorin M. Hitt (2012). “Now IT’s Personal: Offshoring and the Shifting Skill Composition of the US Information Technology Workforce,” *Management Science* 58(4): 678-695. [A previous version appeared as: Tambe, Sonny and Lorin M. Hitt (2010). “Now IT’s Personal: Offshoring and the Shifting Skill Composition of the US Information Technology Workforce,” *Proceedings of the 29<sup>th</sup> Annual International Conference on Information Systems*] (Finalist, Management Science Best Paper Award IS Area, 2014).
16. Tambe, Prasanna, Hitt, Lorin M. and Erik Brynjolfsson (2012). “The Extroverted Firm: How External Information Practices Affect Productivity,” *Management Science* 58(5): 843-859. [A prior version appeared as: Tambe, Sonny, Hitt, Lorin M. and Erik Brynjolfsson

- (2008). "The Extroverted Firm," *Proceedings of the 27th Annual International Conference on Information Systems*] (Runner-Up, INFORMS Times Best Paper Award, 2017)
17. Li, Xinxin, Hitt, Lorin M. and Z. John Zhang (2011). "Product Reviews and Competition in Markets for Repeat Purchase Products," *Journal of Management Information Systems* 27(4): 9-42.
  18. Hitt, Lorin M, Xue, Mei, and Pei-Yu Chen (2011). "The Determinants and Outcomes of Internet Banking Adoption," *Management Science* 57(2): 291-307.
  19. Li, Xinxin and Lorin M. Hitt (2010). "Price Effects in Online Product Reviews: An Analytical Model and Empirical Analysis," *MIS Quarterly* 34(4): 809-831.
  20. Tambe, Prasanna and Lorin M. Hitt (2010). "How Does Offshoring Affect IT Workers?" *Communications of the ACM* 53(10): 72-82.
  21. Li, Xinxin and Lorin M. Hitt (2008). "Self Selection and the Information Role of Product Reviews," *Information Systems Research* 19(4): 456-474.
  22. Wu, Shin-Yi, Hitt, Lorin, Chen, Pei-Yu, and G. Anandalingam (2008) "Customized Bundle Pricing for Information Goods: A Nonlinear Mixed Integer Programming Approach," *Management Science* 54(3): 608-622.
  23. Hitt, Lorin M. and Sonny Tambe (2007) "Broadband Adoption and Content Consumption," *Information Economics and Policy* 19(3-4): 362-378.
  24. Xue, Mei, Hitt, Lorin M. and Patrick T. Harker (2007). "Customer Efficiency, Channel Usage and Firm Performance in Retail Banking," *Manufacturing and Service Operations Management* (9): 535-558.
  25. Eric K. Clemons, Gao, Gordon and Lorin M. Hitt (2006). "When Online Reviews Meet Hyperdifferentiation: A Study of the Craft Beer Industry," *Journal of Management Information Systems* 23(2): 149-171 (a previous version appeared in the *Proceedings of the 37<sup>th</sup> Annual Hawaii International Conference on System Sciences*, Honolulu, HI).
  26. Jacobides, Michael G. and Lorin M. Hitt (2005). "Vertical Scope, Revisited: Transaction Costs vs. Capabilities and Profit Opportunities in Mortgage Banking," *Strategic Management Journal* 26(13): 1209-1227.
  27. Hitt, Lorin M. and Pei-Yu Chen (2005). "Bundling with Customer Self-Selection: A Simple Approach to Bundling Low Marginal Cost Goods," *Management Science* 51(10): 1481-1493.
  28. Clemons, Eric K. and Lorin M. Hitt (2004). "Poaching and the Misappropriation of Information: Transaction Risks of Information Exchange," *Journal of Management Information Systems* 21(2): 87-108. [An earlier version appeared as: Clemons, Eric K. and Lorin M. Hitt (2003). "Poaching and the Misappropriation of Information: Transaction Risks of Information Exchange," *Proceedings of the 37<sup>th</sup> Annual Hawaii International Conference on System Sciences*, Honolulu, HI.]
  29. Snir, Eli and Lorin M. Hitt (2004). "Vendor Screening in Information Technology Contracting with a Pilot Project," *Journal of Organizational Computing and Electronic Commerce* 14(1): 61-88. [An earlier version of this paper appeared as Snir, Eli and Lorin M. Hitt (1999), "Vendor Screening in IT Contracting with a Pilot Project (extended abstract),"

*Proceedings of the 20<sup>th</sup> Annual International Conference on Information Systems*, Charlotte, N.C.: 324-327. (Runner-up for Best Paper Award).]

30. Snir, Eli and Lorin M. Hitt (2003). "Costly Bidding in Online Markets for IT Services," *Management Science* 49(11): 1504-1520.
31. Brynjolfsson, Erik and Lorin M. Hitt (2003) "Computing Productivity: Firm-Level Evidence," *Review of Economics and Statistics* 85(4): 793-808.
32. Brynjolfsson, Erik, Hitt, Lorin M. and Shinkyu Yang (2002) "Intangible Assets: Computers and Organizational Capital," *Brookings Papers on Economic Activity* (1): 137-199. [An earlier version of this paper appeared as Brynjolfsson, Erik, Hitt, Lorin M. and Shinkyu Yang (1998) "Intangible Assets: How the Interaction of Computers and Organizational Structure Affects Stock Market Valuations", *Proceedings of the 19<sup>th</sup> Annual International Conference on Information Systems*, Helsinki, Finland: 8-29.].
33. Chen, Pei-Yu and Lorin M. Hitt (2002) "Measuring Switching Costs and Their Determinants in Internet Enabled Businesses: A Study of the Online Brokerage Industry," *Information Systems Research* 13(3): 255-276. [An earlier version of this paper appeared as Chen, Pei-Yu and Lorin M. Hitt (2000) "Switching Cost and Brand Loyalty in Electronic Markets: Evidence from On-Line Retail Brokers," *21<sup>st</sup> Annual International Conference on Information Systems*, Brisbane, Australia: 134-144.]
34. Hitt, Lorin M., Wu, D.J. and Xiaoge Zhou (2002). "Investment in Enterprise Resource Planning: Business Impact and Productivity Measures," *Journal of Management Information Systems* (Special Issue on ERP) 19(1): 71-98.
35. Hitt, Lorin M. and Frances X. Frei (2002). "Do Better Customers Utilize Electronic Distribution Channels? The Case of PC Banking," *Management Science* 48(6, June): 732-749.
36. Clemons, Eric K., Hann, Il-Horn, and Lorin M. Hitt (2002). "Price Dispersion and Differentiation in Online Travel: An Empirical Investigation," *Management Science* 48(4, April): 534-550.
37. Bresnahan, Timothy, Brynjolfsson, Erik and Lorin M. Hitt (2002). "Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-level Evidence," *Quarterly Journal of Economics*, 117(1): 339-376. [Reprinted as "Tecnología de la Información, Organización del Lugar de Trabajo y Demanda de Trabajadores Calificados: Evidencia a Partir de Datos de Empresa," Chapter 8 in *Reformas Y Equidad Social En America Latina Y El Caribe* (Carlos Eduardo Velez and Pax Castillo-Ruiz, eds.) Banco Interamericano de Desarrollo: 135-168 (2004). An earlier version of this paper appeared as Bresnahan, Timothy, Brynjolfsson, Erik and Lorin M. Hitt (2000) "Technology, Organization and the Demand for Skilled Labor," Chapter 5 in *The New Relationship: Human Capital in the American Corporation* (Margaret M. Blair and Thomas A. Kochan, eds.), Brookings Institution Press: 145-193.]
38. Clemons, Eric K., Hitt, Lorin M., Gu, Bin, Thatcher, Matt E. and Bruce W. Weber (2002). "Impacts of eCommerce and Enhanced Information Endowments on Financial Services: A Quantitative Analysis of Transparency, Differential Pricing and Disintermediation," *Journal of Financial Services Research* 22(1,2): 73-90.
39. Brynjolfsson, Erik and Lorin M. Hitt (2000). "Beyond Computation: Information Technology, Organizational Transformation and Business Performance." *Journal of*

*Economic Perspectives*, 14(4): 23-48. [Reprinted as Brynjolfsson, Erik and Lorin M. Hitt (2004). "Information Technology, Organizational Transformation and Business Performance," Chapter 2 in *Productivity, Inequality and the Digital Economy* (Nathalie Greenan, Yannick L'Horty and Jacques Mairesse, eds.) , MIT Press: 55-91. Also reprinted as Chapter 4 in *Inventing Organizations of the 21<sup>st</sup> Century* (Thomas Malone, Robert Laubacher and Michael S. Scott Morton, eds): 70-99.]

40. Hitt, Lorin M. (1999). "Information Technology and Firm Boundaries: Evidence from Panel Data," *Information Systems Research*, 10(2, June): 134-149.
41. Brynjolfsson, Erik and Lorin M. Hitt (1998). "Beyond the Productivity Paradox," *Communications of the ACM*, 41(8): 49-55.
42. Hitt, Lorin M. and Erik Brynjolfsson (1997). "Information Technology and Internal Firm Organization: An Exploratory Analysis," *Journal of Management Information Systems* 14 (2): 81-101.
43. Brynjolfsson, Erik and Lorin M. Hitt (1996). "Paradox Lost? Firm-Level Evidence on the Returns to Information Systems," *Management Science* 42 (4): 541-558. [reprinted as Section 1 Chapter 1 in *Beyond the IT Productivity Paradox*, (Leslie Willcocks and Stephanie Lester, eds.), John Wiley and Sons: 39-68 (1999) and Section 2 Chapter 1 in *Exploring Information Systems Research Approaches*, (Robert D. Galliers, M. Lynne Markus and Sue Newell, eds.), Routledge: 109-127 (2007). An earlier version of this paper appeared as Brynjolfsson, Erik and Lorin M. Hitt (1993) "Is Information Systems Spending Productive? New Evidence and New Results," *Proceedings of the 14th Annual International Conference on Information Systems*, Orlando, FL. December: 47-64.]. Winner of the Best Paper Award in Information Systems Economics in last seven years (1999 Workshop on Information Systems and Economics).
44. Hitt, Lorin M. and Erik Brynjolfsson (1996). "Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value," *MIS Quarterly* 20(2): 121-142. Winner of 1996 Best Paper award. [An earlier version of this paper appeared as Hitt, Lorin M. and Erik Brynjolfsson (1994) "The Three Faces of IT Value: Theory and Evidence," *Proceedings of the 15th Annual International Conference on Information Systems*, Vancouver, B.C., December. (Winner of Best Paper and Best Paper Addressing Conference Theme Awards): 263-277.]
45. Brynjolfsson, Erik and Lorin M. Hitt (1995) "Information Technology as a Factor of Production: The Role of Differences Among Firms", *Economics of Innovation and New Technology* 3-4: 183-199.
46. Martin, Suzanne, Hitt, Lorin M., and James Rosenberg (1989) "p-Channel Germanium MOSFETs with High Channel Mobility," *IEEE Electron Device Letters* 10(7, July): 325-326.

#### **Refereed Conference Proceedings (Not otherwise published in Journals)**

47. Wu, Lynn, Jin, Fujie and Lorin M. Hitt (2015). "How Do Data Skills Affect Firm Productivity: Evidence from Process-driven vs. Innovation-driven Practices," *Proceedings of the 34<sup>th</sup> Annual International Conference on Information Systems*.



48. Wu, Lynn, Jin, Fujie and Lorin M. Hitt (2015). "Data Skills and the Value of Social Media: Evidence from Large-Sample Firm Value Analysis," *Proceedings of the 34<sup>th</sup> Annual International Conference on Information Systems*. (Updated version: SSRN 2826115)
49. Tambe, Sonny, Hitt, Lorin M. and Erik Brynjolfsson (2011) "The Price and Quantity of IT-Related Intangible Capital," *Proceedings of the 30<sup>th</sup> Annual International Conference on Information Systems*.
50. Gao, Gordon and Lorin M. Hitt (2003). "The Economics of Telecommuting: Theory and Evidence," *Proceedings of the 24<sup>th</sup> Annual International Conference on Information Systems*, Seattle, WA.
51. Chen, Pei-Yu and Lorin M. Hitt (2001) "Brand Awareness and Price Dispersion in Electronic Markets," *22<sup>nd</sup> Annual International Conference on Information Systems*, New Orleans, LA.
52. Gu, Bin and Lorin M. Hitt (2001) "Transactions Costs and Market Efficiency," *22<sup>nd</sup> Annual International Conference on Information Systems*, New Orleans, LA.

## **Other Publications**

### ***Chapters in Books***

53. Chen, Pei-Yu and Lorin M. Hitt (2007). "Information Technology and Switching Costs," in T. Hendershott, ed., *Handbook of Information Systems Economics*.
54. Brynjolfsson, Erik and Lorin M. Hitt (2005) "Intangible but not Unmeasurable: Some Thoughts on the Measure and Magnitude of Intangible Assets," in Carol Corrado and Daniel Sichel, eds., *Measuring Capital in the New Economy*, University of Chicago Press (for NBER).
55. Brynjolfsson, Erik and Lorin M. Hitt (2005) "Intangible Assets and the Economic Impact of Computers," in William Dutton, Brian Kahin, Ramon O'Callaghan, and Andrew Wyckoff, eds., *Transforming Enterprise*, MIT Press.
56. Clemons, Eric K., Hitt, Lorin M. and David C. Croson (2001) "The Future of Retail Financial Services: Transparency, Bypass and Differential Pricing," Chapter 4 in *Tracking a Transformation: E-commerce and the Terms of Competition in Industries* (J. Zysman, ed.), Brookings Institution Press: 92-111.
57. Clemons, Eric K. and Lorin M. Hitt (2001) "Financial Services: Transparency, Differential Pricing and Disintermediation," Chapter 4 in *The Economic Payoff from the Internet Revolution* (R. Litan and A. Rivlin, eds.), Brookings Institution Press: 87-128.
58. Hitt, Lorin M., Frei, Frances X. and Patrick T. Harker. (1999) "How Financial Firms Decide on Technology," Chapter 3 in *Brookings/Wharton Papers on Financial Services:1999*, Litan, Robert E. and Anthony M. Santomero, Eds. Washington, DC: Brookings Institution Press: 93-136.
59. Hitt, Lorin M. (1999). "The Impact of IT Management Practices on the Performance of Life Insurance Companies," Chapter 7 in *Changes in the Life Insurance Industry: Efficiency, Technology and Risk Management* (J. David Cummins and Anthony M. Santomero, eds.), Norwell, MA: Kluwer Academic Publishers: 211-243.

### ***Trade Journal Publications***

60. Brynjolfsson, Erik and Lorin M. Hitt (1997) "Breaking Boundaries", *InformationWeek* 500 September 22: 54-61.
61. Brynjolfsson, Erik and Lorin M. Hitt (1996) "The Customer Counts," *InformationWeek*, September 8: 38-43.
62. Brynjolfsson, Erik and Lorin M. Hitt (1995) "The Productive Keep Producing," *InformationWeek*, September 18: 38-43.

### **Books**

63. Ferguson, Matthew, Hitt, Lorin and Prasanna Tambe. *The Talent Equation*. McGraw Hill, 2013.

### **Reports**

64. Ahluwalia, Simran, Caulfield, Matthew, Davidson, Leah, Diehl, Mary Margaret, Ipsas, Aline, Windle, Michael and Lorin M. Hitt (2017). *The Business of Voting*. Wharton Public Policy Issue Industry Report. (<https://publicpolicy.wharton.upenn.edu/business-of-voting/>)
65. Hitt, Lorin M. and Prasanna Tambe (2011). Technical Report: The Business Case for Healthcare Information Technology in Nursing Homes. White Paper (SSRN 1964841)
66. Beard, Nick, Elo, Kinga Z., Hitt, Lorin M. and Michael G. Housman (2007). The Economics of IT and Hospital Performance. Pricewaterhouse Coopers White Paper ([http://www.pwc.com/us/en/technology-innovation-center/assets/healthindex\\_web-x.pdf](http://www.pwc.com/us/en/technology-innovation-center/assets/healthindex_web-x.pdf))
67. Hitt, Lorin, Wu, Lynn, Campbell, Karen, Jeafarqomi, Karim, Ashtiani, Hamid and Leslie Levesque. "Corporate Data Literacy: Scoring Firms and Firm Performance," IHS Market White Paper, September 2018.

### **Working Papers**

68. Yapar, Ozge, Lobel, Ruben and Lorin M. Hitt (2017). "Technology Sharing in Two Sided Markets." Working Paper.
69. Jin, Fujie, Wu, Andy and Lorin Hitt (2017). "Social is the New Financial: How Startup Social Media Activity Influences Funding Outcomes," Mack Center Working Paper, Wharton School ([https://mackinstitute.wharton.upenn.edu/wp-content/uploads/2017/03/FP0331\\_WP\\_Feb2017.pdf](https://mackinstitute.wharton.upenn.edu/wp-content/uploads/2017/03/FP0331_WP_Feb2017.pdf))
70. Brynjolfsson, Erik, Hitt, Lorin M. and Heekyung Hellen Kim (2011). "Strength in Numbers: how Does Data-Driven Decisionmaking Affect Firm Performance?" Working Paper (SSRN 1919486)
71. Brynjolfsson, Erik, Hitt, Lorin M., Rock, Daniel and Prasanna Tambe (2020). "IT, AI and the Growth of Intangible Capital," Working Paper (SSRN 3416290) (in review).
72. Erol, Etiye Cansu, Hitt, Lorin M. and Prasanna Tambe (2021). "Does EMR Adoption by Nursing Homes Decrease Hospitalization Costs?" Working Paper (SSRN 3725715) (in review).
73. Hitt, Lorin M., Jin, Fujie and Lynn Wu (2016). "Data Analytics Skills and the Corporate Value of Social Media," Working Paper (SSRN 2826115) (in revision).
74. Wong, Xiaoning, Wu, Lynn and Lorin M. Hitt (2021). "Can Social Media Alleviate Inequality? Evidence from Venture Capital Financing," (in revision).

### **Academic Honors**

Management Science, Information Systems Best Paper Award Finalist (2014, 2015, winner 2016)  
Information Systems Research: Best Paper Award (2013)  
Wharton Excellence in Teaching Award, Undergraduate Division (1998, 1999, 2000, 2001, 2003, 2007, 2008, 2012, 2013, 2018, 2019, 2020)  
Best Paper in Information Systems and Economics (last 7 years), Workshop on Information Systems and Economics (1999)  
Runner-up for Best Paper, International Conference on Information Systems (1999, 2004, 2012)  
David Hauck Award for Distinguished Teaching, Wharton School (1999)  
Christian R. and Mary F. Lindback Award for Distinguished Teaching, University of Pennsylvania (1998)  
National Science Foundation CAREER Program Grant Recipient (1998)  
Best Paper Award, Management Information Systems Quarterly (1996)  
International Conference on Information Systems Doctoral Consortium (1995)  
MIT Industrial Performance Center Doctoral Dissertation Fellowship (1995)  
"Best Paper" and "Best Paper Addressing the Conference Theme" Awards at the International Conference on Information Systems (1994)  
DuWayne J. Petersen Fellowship (1992-1996)  
Honorable Mention, National Science Foundation Fellowship (1989)  
Elected to Tau Beta Pi Engineering Society (1988)  
Elected to Sigma Xi Scientific Research Society (1988)  
Finalist, National Merit Scholarship Program (1985)  
National Society of Professional Engineers' Scholarship (1985)  
Honorable Mention, Westinghouse Science Talent Search (1985)

## **Grants**

Analytics at Wharton. AI's Effect on Innovation and Productivity. (\$50K) (12/20 – 12/22).

Commonwealth Fund. The Business Case for Healthcare IT in Nursing Homes. (~\$150K) (1/08 – 12/13).

Co-Principal Investigator (with Mei Xue and Patrick Harker), National Science Foundation. Collaborative Research: Customer Efficiency and the Management of Multi-Channel Service Delivery Systems. Award: ~\$250K (8/05 – 8/07)

Wharton eBusiness Initiative/Mack Center, University of Pennsylvania, Wharton School. Product Reviews, Pricing and Market Strategy. Award: \$10K (5/05-11/05)

Fishman Davidson Center, University of Pennsylvania, Wharton School. Information Technology, Product Variety and Operations (6/2004-6/2005). Award: ~\$18K.

University Research Foundation. Information Technology and Product Variety; Data Development and Analysis. Award: \$18.5K (9/2004-5/2005)

Co-Principal Investigator (with Paul Kleindorfer and D.J. Wu), SAP America. Valuation of ERP in the Oil and Gas Industry. Award: \$40K (10/02-6/03)



Principal Investigator, NSF Grant IRI-9733877 (Computing and Social Systems Program): The Economics of Information Technology, Organization and Productivity: Theory Development and Empirical Investigation. Award: \$309K (6/98-10/04)

Principal Investigator. Customer Behavior in On-Line Markets. Wharton Electronic Commerce Forum. Award: \$25K (6/00 – 6/01).

Principal Investigator. Switching Cost and Pricing in Electronic Markets. Wharton eBusiness Initiative. Award \$25K (6/01-6/02)

## **Journal/Conference Reviews**

### Editorial Board

Information Systems Research (Guest Senior Editor, 2009-2011; Senior Editor, 2007-2008; Associate Editor 2000-2002, 2004 Guest Associate Editor)

Journal of Management Information Systems (2002-present)

Management Science (2002-2008; Departmental Co-Editor – Information Systems, 2008-2015)

SSRN Information Systems and Economics (2004-2008)

### Program Committee

Workshop on Information Systems and Economics (2009 Conference Co-Chair; 2004, Conference Co-Chair)

International Conference on Information Systems (2000, 2003 Associate Editor)

ACM Conference on Electronic Commerce (2007)

International Conference on Information Systems Doctoral Consortium (2007)

NYU CeDER Summer Doctoral Workshop (2007)

### Ad-hoc Reviewer

American Economic Review, Canadian Journal of Economics, Canada Social Science Research and Humanities Council, City University of Hong Kong - Grant Review Committee, Communications of the ACM, Economic Inquiry, European Economic Review, European Journal of Operations Research, Hawaii International Conference on System Sciences  
Industrial Relations, Industrial and Labor Relations Review, Information Economics and Policy, Information Systems Frontiers, Information Systems Research, Information Technology and Management, Journal of Banking and Finance, Journal of Industrial Economics, Journal of Law, Economics and Organization, Journal of Management Information Systems, Journal of Organizational Computing, Journal of Productivity Analysis, Management Science, Managerial and Decision Economics, Manufacturing & Service Operations Management, Marketing Science, McGraw-Hill Textbook Division, MIS Quarterly (occasional Guest Associate Editor), National Science Foundation, Review of Economics and Statistics, Regional Science, Sloan Management Review, Quarterly Journal of Economics

## **Teaching Experience**

Massachusetts Institute of Technology, Sloan School of Management. Course: 15.567 - Introduction to eBusiness, Fall, 2001 (2 sections, co-taught with Erik Brynjolfsson)

University of Pennsylvania, The Wharton School. Course: OPIM101 - Introduction to Operations and Information Management. Fall, 2007; Fall, 2008; Fall, 2009; Fall, 2010; Fall, 2011 (Co-instructor); Fall, 2012; Fall, 2013 (x2); Fall, 2014 (x2) ; Fall, 2015 (x2) (Instructor).

University of Pennsylvania, The Wharton School. Course: OPIM105 - Data Analysis in VBA and SQL. Spring, 2011 (Co-instructor); Spring, 2012; Spring, 2013; Fall, 2013; Fall 2015; Fall 2016 (x2); Fall 2017 (x2); Fall 2018 (x2), Fall 2019 (x2); Spring 2020.

University of Pennsylvania, The Wharton School. Course: OPIM 469 - Advanced Topics in Information Strategy and Economics. Spring, 2000 (x2); Spring, 2001 (x2); Spring, 2002 (x3) (Instructor); Spring, 2003 (Co-instructor, 2 sections); Spring, 2004; Spring, 2005; Spring, 2006; Spring, 2007; Fall, 2008; Spring, 2010; Spring, 2011; Spring, 2012; Spring, 2013, Fall 2014 (Instructor)

University of Pennsylvania, The Wharton School. OPIM669 - Advanced Topics in Information Strategy/Financial Information Systems. Spring, 1998; Spring, 1999; Spring, 2000; Spring, 2001; Spring, 2002 (Guest Lecturer); Spring, 2003 (Co-instructor); Spring, 2004; Spring, 2005; Spring, 2006; Spring, 2007 (Instructor).

University of Pennsylvania, The Wharton School. Tiger Team Field Application Project. Spring, 1999; Spring, 2000; Spring, 2001 (Faculty Advisor for Electronic Commerce/IT projects)

University of Pennsylvania, The Wharton School. Course: EMTM900 – Electronic Commerce Marketing. Spring, 2000 (Guest Lecturer)

University of Pennsylvania, The Wharton School. Course: D-SEM on Electronic Commerce. Fall, 2000

University of Pennsylvania, The Wharton School. Course: OPIM 319 - Advanced Topics in Information Strategy/Advanced Decision Support Systems (now OPIM469). Spring, 1998; Spring, 1999 (Instructor)

University of Pennsylvania, The Wharton School. Course: OPIM 210 - Management Information Systems. Fall, 1996; Spring, 1997; Fall, 1997; Spring, 1998; Spring 1999 (x2); Fall, 2002 (x2); Spring, 2004; Spring, 2006; Fall, 2006; Spring, 2007; Fall, 2007 (Instructor).

University of Pennsylvania, The Wharton School. MBA Pre-Term Exercise on Contract Negotiations for Information Technology Outsourcing. Fall, 1998; Fall, 1999 (with D. Croson and R. Croson)

University of Pennsylvania, The Wharton School. Course: OPIM 950/955/960/961 - Doctoral Seminar in Information Technology: Economics and Organization. Fall, 1997; Fall, 2000 w/ R. Aron as OPIM899; Fall, 2001 (Guest Lecturer); Fall, 2003 (Guest Lecturer); Spring, 2003; Fall, 2004 (Guest Lecturer); Spring, 2005; Spring, 2008; Spring, 2010; Spring, 2012; Spring 2013 (co-Instructor); Spring, 2015; Spring 2016; Spring 2017; Spring 2018; Spring 2019.

University of Pennsylvania, The Wharton School. Course: WH101 – Business and You. Spring, 2017, Fall 2017, Fall 2018, Fall 2019. (cotaught OIDD Session).

University of Pennsylvania, The Wharton School. Course: OPIM 666 - Information: Industry Structure and Competitive Strategy. Winter Quarter, 1997; Spring Quarter, 1997 (Instructor); Guest Lecturer (Fall Quarter, 1999; Fall Quarter, 2000).

Massachusetts Institute of Technology, Sloan School of Management. Course: 15.566 - Information Technology as an Integrating Force in Manufacturing. Spring, 1995 (Teaching Assistant)

Brown University, Department of Engineering. Course: EN 162- Analog Circuit Design. Spring, 1987 (Teaching Assistant)

### **Professional Affiliations**

Sigma Xi, Tau Beta Pi, Association for Computing Machinery, American Economic Association, INFORMS, Association for Information Systems

### **Students Supervised**

#### *Dissertation Supervisor*

Eli Snir (2001): Lecturer, Washington University  
Pei-Yu (Sharon) Chen (2002): Professor, Arizona State University  
Guodong (Gordon) Gao (2005): Associate Professor, University of Maryland  
Xinxin (Mandy) Li (2005): Associate Professor, University of Connecticut  
Prasanna (Sonny) Tambe (2008): Associate Professor, Wharton School  
Fujie Jin (2016): Assistant Professor, Indiana University

#### *Thesis Reader*

Bin Gu (2002): Professor, Arizona State University  
Il-Horn Hann (2000): Professor, University of Maryland  
Michael Jacobides (2000): Professor, London Business School  
Jeff McCullough (2005): Assistant Professor, University of Minnesota  
Ying Liu (2006): Assistant Professor, University of Hawaii  
Ben Powell (2003): Unknown  
Michael Row (2001): Private Industry  
Baba Prasad (2003): Unknown  
Mei Xue (2001): Associate Professor, Boston College  
Matt Thatcher (1999): Assistant Professor, University of Nevada (Las Vegas)  
Shinyi Wu (2003): Assistant Professor, Arizona State University  
Moti Levi (2001): Private Industry  
Antonio (Toni) Moreno-Garcia (2012): Assistant Professor, Northwestern University  
Sergeui Roumanitsev (2006): Private Industry  
Marcelo Olivares (2007): Associate Professor, Columbia University  
Ben Shiller (2011): Assistant Professor, Brandeis University  
Adam Saunders (2011): Assistant Professor, University of British Columbia  
Fangyun (Tom) Tan (2011): Assistant Professor, Southern Methodist University  
Vihbahshu Abhishek (2011): Assistant Professor, Carnegie Mellon University  
Hessam Bavafa (2013): Associate Professor, University of Wisconsin

Yili (Kevin) Hong (2013): Professor, University of Houston  
Dokyun Lee (2014): Assistant Professor, Carnegie Mellon University  
Jing Peng (2015): Assistant Professor, University of Connecticut  
Bowen Lou (2019): Assistant Professor, University of Connecticut

*Other Doctoral Advising*

Fujie Jin (2013): Summer Paper Advisor, Primary Academic Advisor  
Amanda Jensen (2010): Summer Paper Advisor  
Felipe Csaszar (2005): Academic Advisor  
Ozge Yapar (2015-6): Independent study supervisor  
Kayoung Choi (2015): Summer Paper Advisor  
Atiye Cansu Erol (2019): Summer Paper Advisor, Primary Academic Advisor

*Masters Students*

Xiaoge Zhou, OPIM Department, Wharton School (1999-2001): Thesis Supervisor  
Jihae Wee, School of Engineering and Applied Science (2003): Project Supervisor  
Zhu Lu, College of Arts and Sciences (2014): Thesis Supervisor

*MBA Students*

Anna Blaczyck, Wharton School (2004): Independent Study Project Supervisor  
Luca Coltro, Wharton School (1997-1998): Advanced Study Project Supervisor  
Andrew Trader, Wharton School (1999): Advanced Study Project Supervisor

*Undergraduate Students*

Steven Altman, Wharton School (1997): Independent Study Project Supervisor  
Maury Apple, Wharton School (1997): Independent Study Project Supervisor  
Tara Bhandari, Wharton School (2002): Society Project Supervisor  
Thomas Burrell, Engineering School (2001): Senior Project Supervisor  
Todd Bishop, Wharton School (1999): Independent Study Project Supervisor  
Rachel Boim, Wharton School (1999): Independent Study Project Supervisor  
Hope Bromley, Wharton School (2000): Independent Study Project Supervisor  
John Chiang, Wharton School (2001): Society Project Supervisor  
Charlene Chen, Wharton School (2005): Senior Design Project Supervisor  
Robert Dolan, Wharton School (2003-4): Wharton Research Scholars Supervisor  
Ronak Ghandhi, School of Engineering (2013): Senior Design Project Supervisor  
Gabriel Gottlieb, School of Engineering (2002): Senior Design Project Supervisor  
Phuong Ho, Department of Economics (1998): Honors Advisor  
Richard Hooper, Systems Engineering (1999): Independent Study Project Advisor  
Hunter Horsley, Wharton School (2015): Independent Study Project Advisor  
Melinda Hu, Wharton School (2018-2019): Wharton Research Scholars Advisor  
Pawel Hytry, Wharton School (2011-2012): Independent Study Project Advisor  
Ulhas Jagdale, School of Engineering (2013): Senior Design Project Supervisor  
Johnny Kong, Wharton School (2005): Senior Design Project Supervisor  
Amin Laksmi, Computer Science and Engineering (2010): Senior Design Supervisor  
Henrique Laurino, Wharton School (2018): Senior Thesis Supervisor  
Jacob Lefkowitz, Wharton School (1998): Society Project Supervisor  
Steven Levick, Wharton School (2012): Independent Study Supervisor  
Brandon Newberg, Wharton School (2012): Independent Study Supervisor

David Perez y Perez, Wharton School (1999): Independent Study Supervisor  
Nickhil Ramchandi, Wharton School (1999): Independent Study Supervisor  
Reuben Randolph, School of Engineering (1998): Project Supervisor  
Kevin Reeves, School of Engineering (2001): Independent Study Project Supervisor  
Allison Rosen, Wharton School (1997): Independent Study Project Supervisor  
Jennifer Seo, School of Engineering (2000): Senior Design Project Supervisor  
Kyle Smith, Wharton School (2001): Independent Study Project Supervisor  
David Thornton, Wharton School (2005): Senior Design Project Supervisor  
Jon Turow, Wharton School (2005-6): Independent Study Supervisor  
Udack Victor, School of Engineering (2000): Senior Design Project Supervisor  
Jason Wang, Wharton School (1998): Society Project Supervisor  
Melinda Wang, Wharton School (2018): Senior Project Supervisor  
Christine Wong, Wharton School (1997): Society Project Supervisor

### **Other Service**

#### University of Pennsylvania

Academic Dishonesty Disciplinary Committee Panel (2012)  
Trustees Committee on Academic Policy (2009-2010)  
Lindback Teaching Award Committee (1999)

#### Wharton School

Curriculum Innovation and Review Committee (CIRC) (chair, 2016-20)  
Undergraduate Curriculum Evaluation Committee (2014-2016)  
Management Department Q-Review Committee, Chair (2013-2014)  
Wharton Personnel Committee (2009-2011)  
Dean's Advisory Group (2008)  
Panel Moderator, Wharton Asia Business Forum (2006)  
Undergraduate Curriculum Design Committee (2003)  
Ph.D Program Review Committee (2000)  
Dean's Council on Education (2001)  
WebI Curriculum Development Committee (2000)

#### Wharton School, Undergraduate Division

Moderator, Wharton Information Technology Career Panel (1997-99)  
Graduation Speaker (1999)  
Parents Weekend Speaker (1999)  
Hauck Teaching Award Committee (2000-01)  
Electronic Commerce Concentration Advisor (2000-present)  
Wharton/Monitor Corporation Undergraduate Case Competition Judge (2001)  
Deans Award for Excellence Committee (2010, 2006)

#### Wharton School, Department of Operations and Information Management/OIDD

Recruiting Committee (2005, 2006, 2011, 2014, 2016, 2021)  
Doctoral Admissions Committee (2004, 2005, 2011, 2012-13, 2015-7)  
Department Q-Review Committee (1999-00)  
Undergraduate Coordinator (1998-01, 2002-2008)  
Undergraduate Curriculum Committee (1998-01, 2002-2008)  
Department Computing Coordinator (1997)  
Department Representative to Wharton Computing (1997)  
Department Seminar Coordinator (1996, 2010)

Departmental Tenure Committees (2006, 2013, 2014, 2019)  
Wharton School, Public Policy Initiative  
    Wharton/OSET Foundation Project on the Voting Technology Industry (2016)  
Morgan State University  
    Advising on Curriculum Design (2019).  
MIT Center for Coordination Science  
    Seminar Coordinator (1994)  
National Science Foundation  
    Panelist (1998, 2001, 2003, 2005, 2006, 2015)  
    Participant in the NSF CISE/SBE Cyberinfrastructure Workshop (2005)  
International Conference on Information Systems  
    Doctoral Consortium Faculty (2006)  
Other  
    MIT Inclusive Innovation Competition Judge (2016)  
    NYU/CeDER Summer Doctoral Consortium Faculty (2006)



## **Prior Testimony At Trial, Arbitration or Deposition in the Last Four Years**

*VLSI Technology, LLC v. Intel Corporation*, United States District Court for the District of Delaware, Case No. 18-cv-966. July, 2021.

*In Re: Capital One Consumer Data Security Breach Litigation*, United States District Court for the Eastern District of Virginia, Alexandria Division, MDL No. 1:19md2915 (AJT/JFA). May, 2021.

*Epic Games, Inc. v. Apple, Inc.*, United States District Court, Northern District of California, Oakland Division, Case No. 4:20-cv-05640-YGR-TSH. May, 2021.

*Rachel Colangelo et. al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court, Northern District of New York, Case No. 6:18-cv-01228 (LEK/DEP). April, 2021.

*Ramy Shaker et. al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court, Eastern District of Michigan, Southern Division, Case No. 2:18-cv-13603-LJM-DRG. April, 2021.

*Afshin Zarinbaf et. al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court, Northern District of Illinois, Eastern Division, Case No. 1:18-cv-06951. April, 2021.

*Stuart Mackinnon v. Volkswagen Canada Group, Inc., et. al.*, Ontario Superior Court of Justice, File No. CV-17-582746-00CP. February, 2021.

*Andrea M. Williams et al. v. Apple Inc.*, United States District Court for the Northern District of California, Case No. 5:19-cv-4700-LHK. February, 2021.

*Damonie Earl et al. v. The Boeing Company, Southwest Co.*, United States District Court for the Eastern District of Texas, Sherman Division, Case No. 4:19-cv-00507-ALM. January, 2021.

*Jennifer Song and Scott Werkin v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court, District of Minnesota, Case No. 18-cv-03205-PJS-KMM. December, 2020.

*VLSI Technology, LLC v. Intel Corporation*. United States District Court for the Eastern District of Texas, Case No. 19-cv-00977-ADA. September, 2020.

*Jason Counts et. al. v. General Motors Corporation*, United States District Court, Eastern District of Michigan, Case No. 1:16-cv-12541-TLL-PTM. July, 2020.

*Jennifer Nemet et. al. v. Volkswagen Group of America et. al.*, United States District Court for the Northern District of California, Case No. 3:17-cv-04372-CRB. July 2020.



*In Re: Sonic Corp. Customer Data Breach Litigation*, United States District Court for the Northern District of Ohio (Eastern Division at Cleveland), Case No. 1:17-md-02807-JSG. April, 2020.

*Kimberley Laura Smith-Brown et. al. v. Ulta Beauty, Inc. and Ulta Salon, Cosmetics and Fragrances, Inc.*, United States District Court for the Northern District of Illinois, Eastern Division, Case No. 1:18-cv-610. February, 2020.

*The California Institute of Technology v. Broadcom Limited, Broadcom Corporation, Avago Technologies Limited, Apple, Inc. and Cypress Semiconductor Corporation*, United States District Court for the Central District of California, Case No. 2:16-cv-3714-GW (AGRx). January, 2020.

*Scott Weaver v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court for the Central District of California, Western Division, Case No. 2:18-cv-01996-JPS. September, 2019.

*Dolby Laboratories Licensing Corporation and Dolby Corporation AB v. Adobe Systems Incorporated.*, United States District Court for the Northern District of California, Oakland Division, Case No. 3:18-cv-01553-YGR. July, 2019.

*Anthony Shamrell et al. v. Apple Inc.*, Superior Court of the State of California, County of San Diego, Case No: 37-2013-00055830-CU-PL-CTL. May, 2016 and June, 2019.

*Jennifer Reitman et. al. v. Champion Petfoods USA, Inc. and Champion Petfoods LP*, United States District Court for the Central District of California, Western Division, Case No. 2:18-cv-01736-DOC-JPR. May, 2019.

*Riley Johannessohn, et al., v. Polaris Industries Inc.* (class action), United States District Court District of Minnesota, Case No. 0:16-cv-03348-PJS-LIB. March, 2019.

*Route1 Inc. v. Airwatch LLC.*, United States District Court for the District of Delaware, Case No. 17-331-KAJ. March, 2019.

*Carl Zeiss AG and ASML Netherlands B.V. v. Nikon Corporation, Sendai Nikon Corporation, and Nikon, Inc.*, United States District Court for the Central District of California, Case No. 2:17-cv-03221-RGK (MRWx). May, 2018.

*Buckeye Tree Lodge and Sequoia Village Inn, LLC, and 2020 O Street Corporation, Inc. D/B/A The Mansion on O Street v. Expedia, Inc., Hotels.com, L.P., Orbitz, LLC, Venere Net S.R.L. DBA Venere Net, LLC and Expedia Australia Investments PTY LTD* (class action), United States District Court for the Northern District of California, Case No. 3:16-CV-04721-VC. April, 2018.

*California Opt Out Arbitrations in VW Diesel Emissions Litigation.*

Michelle L. Pennings v. Drew Ford dba Drew Volkswagen. November, 2017.

Laura A. Frerking and Roberts J. Frerking v. Dirito Brothers Walnut Creek, Inc.; Caleb A. Lugliani v. Dirito Brothers Walnut Creek, Inc. October, 2017.

Michael J. Taylor and Vicky M. Taylor v. Circle Motors, Inc. dba South Bay Volkswagen. October, 2017.

Taner Pamuk & Sarah D. Hartmann v. M&M Automotive Group, Inc. dba Volkswagen of Oakland. December, 2017.

Katrina M. Manos v. J.C.H Investments, dba Murietta Volkswagen. December, 2017.

Timothy Hassett v. Q&S Automotive LLC, dba Audi Oakland. March, 2018.

Steve Duke v. Central Valley Automotive, dba Central Valley Volkswagen. May, 2018.

Evan Lippincott & Emily Lippincott v. PAG Santa Ana AVW, Inc. dba Audi South Coast. April, 2018.

*Realtime Data LLC v. Rackspace US, Inc., NetApp, Inc., and SolidFire LLC*, United States District Court for the Eastern District of Texas, Case No. 6-16-cv-00961. September, 2017.

## Documents Relied Upon

### Academic Articles

- Anja Lambrecht et al., “How Do Firms Make Money Selling Digital Goods Online?” *Mark Lett*, 25(3), 2014, pp. 331–341.
- Anindya Ghose and Sang Pil Han, “Estimating Demand for Mobile Applications in the New Mobile Economy,” *Management Science*, 60(6), 2014, pp. 1470–1488.

### Books

- David Besanko and Ronald R. Braeutigam, “2.2 Price Elasticity of Demand” in *Microeconomics*, 4th edition, (New Jersey: John Wiley & Sons, Inc., 2011), pp. 43–50.

### Data

- APL\_APPSTORE\_08822222
- APL-APPSTORE\_10334265
- APL-APPSTORE\_10750377
- App Annie Category ID Data
- App Annie Product ID Data
- App Annie Publisher ID Data
- App Annie Store Product Level Data
- App Annie Unified Category ID Data
- EPIC\_04315058
- EPIC\_04315058\_1
- EPIC\_04315058\_3
- EPIC\_04315058\_5
- Mac App Store Data
- VALVE 001393 – 522

## **Declarations and Expert Reports**

- Declaration of Craig Donato in Support of Non-Party Roblox Corporation's Response to Epic Games Inc. and Apple Inc.'s Subpoenas, January 15, 2021.
- Expert Class Certification Report of Professor Einer Elhauge, June 1, 2021.
- Expert Class Certification Report of Professor Nicholas Economides, with Backup Materials, June 1, 2021.
- Expert Rebuttal Report of Dominique Hanssens, Ph.D., March 15, 2021.
- Expert Rebuttal Report of Lorin Hitt, Ph.D., March 15, 2021.
- Expert Report and Declaration of Aviel D. Rubin, Ph.D., August 10, 2021.
- Expert Report and Declaration of Itamar Simonson, Ph.D., August 10, 2021.
- Expert Report and Declaration of James E. Malackowski, August 10, 2021.
- Expert Report and Declaration of Jeffrey T. Prince, Ph.D., August 10, 2021.
- Expert Report and Declaration of Richard Schmalensee, Ph.D., August 10, 2021.
- Expert Report and Declaration of Robert D. Willig, Ph.D., August 10, 2021.
- Expert Report of Daniel L. McFadden In Support of Plaintiff's Motion for Class Certification, June 1, 2021.

## **Depositions**

- Deposition of Carson Oliver (Apple), Volume I, January 26, 2021.
- Deposition of Christian Tregillis, CPA, ABV, CFF, CLP, August 2, 2021.
- Deposition of Daniel McFadden, Ph.D., August 3, 2021.
- Deposition of Donald R. Cameron, June 25, 2021.
- Deposition of Eddy Cue (Apple), February 8, 2021.
- Deposition of Einer Elhauge, July 30, 2021.
- Deposition of Joe Kreiner (Epic), February 5, 2021.
- Deposition of Mark Rollins (Apple), February 11, 2021.
- Deposition of Nicholas Economides, August 4, 2021.
- Deposition of Nicholas Penwarden (Epic), Volume I, January 26, 2021.
- Deposition of Philip Schiller (Apple), Volume I, February 11, 2021.
- Deposition of Philip Schiller (Apple), Volume II, February 15, 2021.

- Deposition of Pure Sweat Basketball, June 17, 2021.
- Deposition of Steven Allison (Epic), Volume I, February 9, 2021.
- Deposition of Timothy Cook (Apple), Volume I, February 12, 2021.
- Deposition of Timothy Sweeney, Volume I, February 8, 2021.

### **Legal Pleadings**

- Bench Trial Transcript, *Epic Games, Inc., v. Apple, Inc., and Apple, Inc., v. Epic Games, Inc.*, Volumes I-X, May 3-14, 2021.
- Developer Plaintiffs' Motion for Class Certification, *Donald R. Cameron, et al., v. Apple Inc.*, November 16, 2021.
- Order Granting Stipulation for Leave to File Third Amended Consolidated Class Action Complaint, *In Re Apple iPhone Antitrust Litigation*, September 17, 2020.
- Plaintiff's Consolidated Class Action Complaint for Violations of the Sherman Act and California Unfair Competition Law, Donald R. Cameron, a California Resident; Pure Sweat Basketball, Inc., an Illinois corporation; and Barry Sermons a Georgia resident, on behalf of themselves and all others similarly situated v. Apple Inc., a California corporation, September 30, 2019.
- Prosys Consultants Ltd. and Neil Godfrey v. Microsoft Corporation and Microsoft Canada Co./Microsoft Canada CIE, Supreme Court of British Columbia, October 31, 2013.

### **Market Research**

- 42 Matters, "Google Play Statistics and Trends 2021," available at <https://42matters.com/google-play-statistics-and-trends2021>.
- 42Matters, "Amazon App Store Statistics and Trends 2021," August 2, 2021, available at <https://42matters.com/amazon-appstore-statistics-and-trends>.
- Jonathan Borck, et al., "Apple's App Store and Other Digital Marketplaces: A Comparison of Commission Rates," Analysis Group, July 22, 2020, available at [https://www.analysisgroup.com/globalassets/insights/publishing/apples\\_app\\_store\\_and\\_other\\_digital\\_marketplaces\\_a\\_comparison\\_of\\_commission\\_rates.pdf](https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf).
- Jonathan Borck, et al., "How Large Is the Apple App Store Ecosystem? A Global Perspective for 2019," Analysis Group, June 15, 2021, available at <https://www.apple.com/newsroom/pdfs/apple-app-store-study-2020.pdf>.

## Press Releases

- Amazon Appstore, “Appstore Blogs: Coming Soon: Amazon Appstore Small Business Accelerator Program,” June 15, 2021, available at <https://developer.amazon.com/blogs/appstore/post/93e89be7-1611-4764-8f97-f4eef0a7c0e0/coming-soon-amazon-appstore-small-business-accelerator-program>.
- Apple Newsroom, “Apple announces App Store Small Business Program,” November 18, 2020, available at <https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/>.
- Apple, “Apple Reinvents the Phone with iPhone,” January 9, 2007, available at <https://www.apple.com/newsroom/2007/01/09Apple-Reinvents-the-Phone-with-iPhone/>.
- Apple, “Condensed Consolidated Statements of Operations (Unaudited),” 2021, available at [https://www.apple.com/newsroom/pdfs/FY21\\_Q3\\_Consolidated\\_Financial\\_Statements.pdf](https://www.apple.com/newsroom/pdfs/FY21_Q3_Consolidated_Financial_Statements.pdf).
- Epic Games, “Epic Games Store Weekly Free Games in 2020!” January 14, 2020, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-weekly-free-games-in-2020>.
- Epic Games, “The Epic Games store is now live,” December 6, 2018, available at <https://www.epicgames.com/store/en-US/news/the-epic-games-store-is-now-live>.
- Microsoft Store Team, “A New Microsoft Store revenue share is coming,” Windows Blogs, May 7, 2018, available at <https://blogs.windows.com/windowsdeveloper/2018/05/07/a-new-microsoft-store-revenue-share-is-coming/>.
- Microsoft Store Team, “Updated Microsoft Store App Developer Agreement: New Revenue Share,” Windows Blogs, March 6, 2019, available at <https://blogs.windows.com/windowsdeveloper/2019/03/06/updated-microsoft-store-app-developer-agreement-new-revenue-share/>.
- Samsung Newsroom, “Samsung Electronics Launches Samsung GALAXY Apps,” July 11, 2014, available at <https://news.samsung.com/global/samsung-electronics-launches-samsung-galaxy-apps>.
- Sony, “PlayStation®3 Launches Next Generation of Entertainment in North America,” November 17, 2006, available at [https://www.sony.com/content/sony/en/en\\_us/SCA/company-news/press-releases/sony-computer-entertainment-america-inc/2006/playstation3-launches-next-generation-of-entertainment-in-north-america.html](https://www.sony.com/content/sony/en/en_us/SCA/company-news/press-releases/sony-computer-entertainment-america-inc/2006/playstation3-launches-next-generation-of-entertainment-in-north-america.html).

## Public Press

- Abner Li, “Google Makes Big Push for New Wear OS, TV, Auto, & Tablet Media Apps by Reducing Its Commission,” 9to5Google, June 23, 2021, available at <https://9to5google.com/2021/06/23/google-play-media-experience-program/>.
- Adrian Calimlim, “Pocket God: Ooga Jump Makes The Leap To The Freemium Side With Latest Update,” AppAdvice, December 12, 2013, available at <https://appadvice.com/appnn/2013/12/pocket-god-ooga-jump-makes-the-leap-to-the-freemium-side-with-latest-update>.
- Alex Sherman, “How to Tell Who’s Winning — And Who’s Losing — The Streaming Wars,” CNBC, February 18, 2021, <https://www.cnbc.com/2021/02/18/streaming-wars-how-to-tell-whos-winning-and-whos-losing.html>.
- Alexandra Chang, “Microsoft Officially Announces Windows 8 for October,” Wired, July 9, 2012, available at <https://www.wired.com/2012/07/microsoft-officially-announces-windows-8-for-october/>.
- American Dialect Society, “‘App’ voted 2010 word of the year by the American Dialect Society (UPDATED),” January 8, 2011, available at <https://www.american-dialect.org/app-voted-2010-word-of-the-year-by-the-american-dialect-society-updated>.
- Andrew Webster, “Fortnite Has Been Installed on ‘Nearly Half’ of All Nintendo Switch Systems,” The Verge, October 31, 2018, available at <https://www.theverge.com/2018/10/31/18047958/fortnite-nintendo-switch-downloads>.
- AppFutura, “Alternative app stores,” June 29, 2015, available at <https://www.appfutura.com/blog/alternative-app-stores/>.
- Benjamin Mayo, “Apple removes Dice Games, Educational Games, and Catalogs categories from App Store,” 9to5Mac, October 4, 2017, available at <https://9to5mac.com/2017/10/04/dice-games-catalogs-removed-app-store/>.
- Brad Chacos, “Can the Windows Store possibly be ready by Oct. 26?,” PC World, October 1, 2012, available at <https://www.pcworld.com/article/2010853/can-the-windows-store-possibly-be-ready-by-oct-26.html>.
- Brendan Sinclair, “Discord store offering developers a 90/10 revenue split,” gamesindustry.biz, December 14, 2018, available at <https://www.gamesindustry.biz/articles/2018-12-14-discord-store-offering-developers-a-90-10-revenue-split>.



- Brendan Sinclair, “Epic Games Store adds Itch.io app,” GamesIndustrybiz.com, April 22, 2021, available at <https://www.gamesindustry.biz/articles/2021-04-22-epic-games-store-adds-itch-io-app>.
- Catalin Cimpanu, “Details of 20 million Aptoide app store users leaked on hacking forum,” April 17, 2020, available at <https://www.zdnet.com/article/details-of-20-million-aptoide-app-store-users-leaked-on-hacking-forum/>.
- Chris Welch, “Discord gives up on subscription games because no one was playing them,” The Verge, September 13, 2019, available at <https://www.theverge.com/2019/9/13/20864278/discord-nitro-games-subscription-bundle-discontinued>.
- Chris Welch, “Netflix stops offering in-app subscriptions for new and returning customers on iOS,” The Verge, December 28, 2018, available at <https://www.theverge.com/2018/12/28/18159373/netflix-in-appsubscriptions-iphone-ipad-ios-apple>.
- Chuong H. Nguyen, “Microsoft Wants a Bigger Cut of the Revenue from Windows Developers,” Windows Central, November 20, 2014, available at <https://www.windowscentral.com/microsoft-wants-bigger-cut-revenue-windows-developers>.
- Clairbelle Deveza, “Tesla App Store Could Be the Next Level Ecosystem for the EV Automaker,” Tesmanian, July 23, 2020, available at <https://www.tesmanian.com/blogs/tesmanian-blog/tesla-tsla-app-store-full-self-driving>.
- Colin Stevens, “Apple Says the New iPad Pro Is as Powerful as an Xbox One S,” IGN, November 6, 2018, available at <https://www.ign.com/articles/2018/10/30/apple-says-the-new-ipad-pro-is-as-powerful-as-an-xbox-one-s>.
- D. Murph, “Apple Mac App Store: open for business starting January 6th,” Engadget, December 16, 2010, available at <https://www.engadget.com/2010-12-16-apple-mac-app-store-open-for-business-starting-january-6th.html>.
- Dan Thorp-Lancaster, “Microsoft Store now gives app developers a bigger cut of revenues,” Windows Central, March 5, 2019, available at <https://www.windowscentral.com/microsoft-store-now-gives-app-developers-bigger-cut-revenue>.
- Daniel Eran Dilger, “How Intel Lost the Mobile Chip Business to Apple’s Ax ARM Application Processors,” AppleInsider, January 19, 2015, available at <https://appleinsider.com/articles/15/01/19/how-intel-lost-the-mobile-chip-business-to-apples-ax-arm-application-processors>.
- Daniel Eran Dilger, “Inside Metal: How Apple plans to unlock the secret graphics performance of the A7 chip,” *Apple Insider*, June 16, 2014, available at

- <https://appleinsider.com/articles/14/06/16/inside-metal-how-apple-plans-to-unlock-the-secret-graphics-performance-the-a7-chip>.
- Daniel Frankel, “U.S. Streaming Video Revenue Surpassed \$26.5 Billion in 2020, DEG Says,” NextTV, January 27, 2021, <https://www.nexttv.com/news/us-digital-video-revenue-surpassed-dollar265-billion-in-2020-deg-says>.
  - Darrell Etherington, “GOG.com Opens a New Indie Developer Portal As It Looks To Broaden Its DRM-Free Games Catalogue,” Tech Crunch, August 19, 2013, available at <https://techcrunch.com/2013/08/19/gog-com-opens-a-new-indie-developer-portal-as-it-looks-to-broaden-its-drm-free-games-catalogue/>.
  - Dave Thier, “Xbox Series X Vs. PlayStation 5: Developers Clearly Favor One Over The Other,” Forbes, January 25, 2020, available at <https://www.forbes.com/sites/davidthier/2020/01/25/xbox-series-x-vs-playstation-5-developers-clearly-favor-one-over-the-other/?sh=22204a6c46e0>.
  - David Friend, “RIM’s rise and fall: A short history of Research In Motion,” The Canadian Press, January 28, 2013, available at <https://globalnews.ca/news/384832/rims-rise-and-fall-a-short-history-of-research-in-motion/>.
  - Dean Takahashi, “Graphics guru Tim Sweeney explains why Apple's Metal will make mobile games far better,” *VentureBeat*, June 3 2014, available at <https://venturebeat.com/2014/06/03/graphics-guru-tim-sweeney-explains-why-apples-metal-will-make-games-run-10-times-more-efficiently/>.
  - Dieter Bohn, “Fortnite for Android Has Also Been Kicked Off the Google Play Store,” The Verge, August 13, 2020, available at <https://www.theverge.com/2020/8/13/21368079/fortnite-epic-android-banned-google-play-app-store-rule-violation>.
  - Dustin Bailey, “Steam just reached 50,000 total games listed,” PCGames, February 12, 2021, available at <https://www.pcgamesn.com/steam/total-games>.
  - Eddie Makuch, “GOG Celebrates Six Years of Advancing the ‘DRM-Free Movement,’” Gamespot, September 8, 2014, available at <https://www.gamespot.com/articles/gog-celebrates-six-years-of-advancing-the-drm-free/1100-6422150/>.
  - Gary Sims, “I want to develop Android apps—What languages should I learn?” Android Authority, August 10, 2019, available at <https://www.androidauthority.com/develop-android-appslanguages-learn-391008/>.
  - Gregg Keizer, “Microsoft Slates Windows 8 Beta for Late February 2012,” Computerworld, December 7, 2011, available at <https://www.computerworld.com/article/2499984/microsoft-slates-windows-8-beta-for-late-february-2012.html>.

- Greg Kumparak, “Discord is launching a game store,” TechCrunch, August 9, 2018, available at <https://techcrunch.com/2018/08/09/discord-is-launching-a-game-store/>.
- Grizz0, “Approval for Commerce Currently on Pause,” Discord, <https://support-dev.discord.com/hc/en-us/articles/360041437171>.
- Harrison Weber, “Android passes 1.4B active devices as Google Play passes 1B active users,” Venture Beat, September 29, 2015, available at <https://venturebeat.com/2015/09/29/android-passes-1-4b-active-devices-google-play-passes-1b-active-users/>.
- Hayley Tsukayama, “Nintendo eShop to launch June 6,” The Washington Post, May 12, 2011, available at [https://www.washingtonpost.com/blogs/faster-forward/post/nintendo-eshop-to-launch-june-6/2011/05/12/AFcwWM1G\\_blog.html](https://www.washingtonpost.com/blogs/faster-forward/post/nintendo-eshop-to-launch-june-6/2011/05/12/AFcwWM1G_blog.html).
- Igor Bonifacic, “Spotify is now available on the Epic Games Store,” Engadget, December 17, 2020, available at <https://www.engadget.com/spotify-epic-games-store-183259781.html>.
- Jacob Kastrenakes, “BlackBerry will bring thousands of apps from Amazon’s store to its phones,” The Verge, June 18, 2014, available at <https://www.theverge.com/2014/6/18/5820472/blackberry-phones-getting-amazon-appstore-apps-in-bb10-3>.
- James Batchelor, “Discord Game Store refocuses on Nitro subscription, devs can now sell games directly,” gamesindustry.biz, March 14, 2019, available at <https://www.gamesindustry.biz/articles/2019-03-14-discord-game-store-refocuses-on-nitro-subscription-as-servers-allow-devs-to-sell-games-directly>.
- Jason Kincaid, “Amazon’s Android App Store Launches: Test Drive Apps Directly From Your Browser,” Tech Crunch, March 22, 2011, available at <https://techcrunch.com/2011/03/22/amazon-android-app-store-3/>.
- Jay Peters, “How Amazon’s Luna Cloud Gaming Service Compares to Stadia, xCloud, and GeForce Now,” The Verge, September 25, 2020, available at <https://www.theverge.com/2020/9/25/21454917/amazon-luna-cloud-gaming-comparison-google-stadia-microsoft-xcloud-game-pass-geforce-now>.
- Jay Peters, et al., “Valve’s gaming handheld is called the Steam Deck and it’s shipping in December,” The Verge, July 15, 2021, available at <https://www.theverge.com/2021/7/15/22578783/valve-steam-deck-gaming-handheld-pc>.
- John Gaudiosi, “How Infinity Blade III Was Built From Scratch To Show Off Your iPhone 5S,” Fast Company, September 10, 2013, available at <https://www.fastcompany.com/3017153/how-infinity-blade-iii-was-built-from-scratch-to-show-off-your-iphone-5s>.

- Jordan Sirani, “Top 10 Best-Selling Video Games of All Time,” IGN, April 19, 2019, available at <https://www.ign.com/articles/2019/04/19/top-10-best-selling-video-games-of-all-time>.
- Joseph Yaden, “The bestselling games of all time,” Digitaltrends, March 25, 2021, available at <https://www.digitaltrends.com/gaming/bestselling-games-of-all-time/>.
- Josh Constine, “YouTube Red, A \$9.99 Site-Wide Ad-Free Subscription With Play Music, Launches Oct 28,” Tech Crunch, October 21, 2015, available at <https://techcrunch.com/2015/10/21/youtube-red/>.
- Julia Alexander, “Netflix Won’t ‘Shy Away from Taking Bold Swings’ as Streaming Competition Heats Up,” The Verge, October 16, 2019, available at <https://www.theverge.com/2019/10/16/20917387/netflix-streaming-wars-earnings-subscribers-q3-disney-apple-stranger-things>.
- Julia Boorstin and Steve Kovach, “Quibi Officially Announces It’s Shutting Down,” CNBC, October 21, 2020, <https://www.cnbc.com/2020/10/21/quibi-to-shut-down-after-just-6-months.html>.
- Julie Strietelmeier, “Palm V Review,” The Gadgeteer, February 28, 1999, available at [https://the-gadgeteer.com/1999/02/28/palm\\_v\\_review/](https://the-gadgeteer.com/1999/02/28/palm_v_review/).
- K. Holt, “Microsoft Store is getting a much-needed overhaul for Windows 11,” Engadget, June 24, 2021, available at <https://www.engadget.com/windows-11-microsoft-store-redesign-154155457.html>.
- Karar Haider, “Best Google Play Store Alternatives,” übergizmo, November 29, 2015, available at <https://www.ubergizmo.com/articles/google-play-store-alternatives/>.
- Kevin Murnane, “Taking A Realistic View On Porting Games To Nintendo’s Switch,” Forbes, March 14, 2018, available at <https://www.forbes.com/sites/kevinmurnane/2018/03/14/taking-a-realistic-view-on-porting-games-to-nintendos-switch/?sh=1d75715340a1>.
- Kyle Orland, “Epic CEO: ‘You’re going to see lower prices’ on Epic Games Store,” Ars Technica, March 20, 2019, available at <https://arstechnica.com/gaming/2019/03/epic-ceo-youre-going-to-see-lower-prices-on-epic-games-store/>.
- Kyle Orland, “Epic Games Store launches with extremely limited selection of games,” Ars Technica, December 6, 2018, available at <https://arstechnica.com/gaming/2018/12/epic-games-store-launches-with-extremely-limited-selection-of-games/>.
- Kyle Orland, “Why one PC developer turned down the security of Epic’s exclusivity offer,” Ars Technica, August 19, 2019, available at

- <https://arstechnica.com/gaming/2019/08/why-one-pc-developer-turned-down-the-security-of-epics-exclusivity-offer/>.
- Lauren Goode, “Apple’s new subscription offerings are now available to App Store developers,” The Verge, September 2, 2016, available at <https://www.theverge.com/2016/9/2/12774758/apple-developers-app-store-new-subscription-rules>.
  - Lori Grunin and Sean Hollister, “Fortnite for Android: Epic tells us why it won’t be on Google’s Play Store,” CNET, August 3, 2018, available at <https://www.cnet.com/news/want-fortnite-for-android-you-wont-get-it-from-the-google-play-store/>.
  - Manish Singh, “Google Play drops commissions to 15% from 30%, following Apple’s move last year,” Tech Crunch, March 16, 2021, available at <https://techcrunch.com/2021/03/16/google-play-drops-commissions-to-15-from-30-following-apples-move-last-year/>.
  - Mansoor Iqbal, “App Download and Usage Statistics (2020),” Business of Apps, May 6, 2021, available at <https://www.businessofapps.com/data/app-statistics/>.
  - Mark Hachman, “Minecraft’s PC Share Shrinks as Users Stampede to Cheaper Console and Mobile Versions,” PCWorld, June 2, 2016, available at <https://www.pcworld.com/article/3077990/minecrafts-pc-share-shrinks-as-users-stampede-to-cheaper-console-and-mobile-versions.html>.
  - Matt Brown, “Xbox Store Rebranding to ‘Microsoft Store’ on Xbox One,” Windows Central, September 28, 2017, available at <https://www.windowscentral.com/xbox-store-rebranded-microsoft-store>.
  - Matt Sayer and Tyler Wilde, “The 15-year evolution of Steam,” PC Gamer, September 12, 2018, available at <https://www.pcgamer.com/steam-versions>.
  - Melissa Perenson, “Google Launches Android Market,” PCWorld, October 22, 2008, available at [https://www.pcworld.com/article/152613/google\\_android\\_ships.html](https://www.pcworld.com/article/152613/google_android_ships.html).
  - Michael Andronico, “Samsung’s Revamped Galaxy Apps Takes on Google Play,” July 11, 2014, available at <https://www.laptopmag.com/articles/samsung-galaxy-apps-store>.
  - Mike Ricciuti, “Microsoft apps all business,” CNet, January 2, 2002, available at <https://www.cnet.com/news/microsoft-apps-all-business/>.
  - Mitja Rutnik, “What was Android Market and how is Google Play different?” Android Authority, December 4, 2017, available at <https://www.androidauthority.com/android-market-google-play-different-787082/>.

- Nathan McAlone, “Netflix Says It Now Has over 300 Million ‘Viewers,’” Business Insider, October 26, 2017, available at <https://www.businessinsider.com/netflix-has-300-million-viewers-2017-10>.
- Nathan, “7 Alternative Appstores for Your Android Tablet or eReader,” TheEbookReader.com, February 8, 2012, available at <https://blog.the-ebook-reader.com/2012/02/08/7-alternative-appstores-for-your-android-tablet-or-ereader/>.
- Nelly, “The Discord Store Beta,” Discord Blog, August 9, 2018, available at <https://blog.discord.com/the-discord-store-beta-9a35596fdd4>.
- Nelly, “Why not 90/10?” December 14, 2018, Discord Blog, <https://blog.discord.com/why-not-90-10-3761ebef4eab>.
- Nick Statt, “Apple Just Kicked Fortnite Off the App Store,” The Verge, August 13, 2020, available at <https://www.theverge.com/2020/8/13/21366438/apple-fortnite-ios-app-store-violations-epic-payments>.
- Nick Statt, “Discord’s game store launches globally today with indie gems like Hollow Knight and Dead Cells,” October 16, 2018, The Verge, available at <https://www.theverge.com/2018/10/16/17980810/discord-digital-game-distribution-store-steam-competitor-nitro-subscription-service>.
- Nick Statt, “Fortnite for Android Will Ditch Google Play Store for Epic’s Website,” The Verge, August 3, 2018, available at <https://www.theverge.com/2018/8/3/17645982/epic-games-fortnite-android-version-bypass-google-play-store>.
- Nick Statt, “Valve’s new Steam revenue agreement gives more money to game developers,” The Verge, November 30, 2018, available at <https://www.theverge.com/2018/11/30/18120577/valve-steam-gamemarketplace-revenue-split-new-rules-competition>.
- Nick Wingfield, “‘The Mobile Industry’s Never Seen Anything Like This’: An Interview With Steve Jobs at the App Store’s Launch,” The Wall Street Journal, July 25, 2018, available at <https://www.wsj.com/articles/the-mobile-industrys-never-seen-anything-like-this-an-interview-with-steve-jobs-at-the-app-stores-launch-1532527201>.
- Nick Wingfield, “Apple Opens iPhone to Outside Software,” The Wall Street Journal, October 18, 2007, available at <https://www.wsj.com/articles/SB119263585523362090>.
- Ninichi, “11 Places to Publish & Release Your Indie Game,” Ninichi Music, September 12, 2017, available at <https://ninichimusic.com/blog/2017/9/1/11-places-to-publish-release-your-indie-game>.



- Oliver Roll, “OneNote and Lync Come to Windows Store,” Microsoft, October 26, 2012, available at <https://www.microsoft.com/en-us/microsoft-365/blog/2012/10/26/onenote-and-lync-come-to-windows-store/>.
- Perforce, “What You Need For Cross Platform Game Development,” November 19, 2020, available at <https://www.perforce.com/blog/vcs/cross-platform-game-development>. Phil Muncaster, “Samsung announces app store launch date,” CRN, September 1, 2009, available at <https://www.crn.com.au/news/samsung-announces-app-store-launch-date-154517>.
- Purnima Kochikar, “Continuing to Boost Developer Success on Google Play,” Android Developers Blog, June 23, 2021, available at <https://android-developers.googleblog.com/2021/06/continuing-to-boost-developer-success.html>.
- R.T. Watson, “Netflix, Disney and Amazon’s Streaming Wars Heat Up Overseas,” The Wall Street Journal, April 22, 2021, available at <https://www.wsj.com/articles/netflix-disney-and-amazons-streaming-wars-heat-up-overseas-11619083801>.
- Rachel Kaser, “Fortnite won’t be on Google Play, so here’s how Android users can get it,” TNW, August 8, 2018, available at <https://thenextweb.com/gaming/2018/08/03/fortnite-google-play-android-users/>.
- Rick Lane, “What’s the state of DRM in 2020?” Rock Paper Shotgun, May 28, 2020, available at <https://www.rockpapershotgun.com/whats-the-state-of-drm-in-2020>.
- Sam Byford, “Apple Fires Back at Epic: ‘We Won’t Make an Exception,’” The Verge, August 17, 2020, available at <https://www.theverge.com/2020/8/17/21373108/apple-response-epic-app-store-fortnite-lawsuit>.
- Sam Machkovech, “Apple gets heavy with gaming, announces Metal development platform,” Ars Technica, June 2, 2014, available at <https://arstechnica.com/gadgets/2014/06/apple-gets-heavy-with-gaming-announces-metal-development-platform/>.
- Sarah Perez, “App Revenue Tops \$39 Billion in First Half of 2019, up 15% from First Half of Last Year,” Tech Crunch, July 3, 2019, available at <https://techcrunch.com/2019/07/03/app-revenue-tops-39-billion-in-first-half-of-2019-up-15-from-first-half-of-last-year/>.
- Sarah Shelton, et al., “Best Streaming Services of 2021,” U.S. News, June 17, 2021, available at <https://www.usnews.com/360-reviews/streaming-services>.
- Sean Hollister, “Nvidia’s GeForce Now is Finally Out of Beta, Challenges Google Stadia at \$5 a Month,” The Verge, February 4, 2020, available at <https://www.theverge.com/2020/2/4/21121996/nvidia-geforce-now-2-0-out-of-beta-rtx>.



- Shaun Prescott, “Minecraft: Bedrock Edition Has Full Crossplay Support Now That PS4 Has Opted In,” PC Gamer, December 9, 2019, available at <https://www.pcgamer.com/minecraft-bedrock-edition-has-full-crossplay-support-now-that-ps4-has-opted-in/>.
- Shaun Prescott, “The most popular desktop gaming clients, ranked,” PC Gamer, July 5, 2019, available at <https://www.pcgamer.com/the-most-popular-desktop-gaming-clients-ranked/>.
- Sophie Webster, “Google's Play Media Experience Program Lets App Developers Keep More of What They Earn,” Tech Times, June 24, 2021, available at <https://www.techtimes.com/articles/261927/20210624/googles-play-media-experience-program-lets-app-developers-keep-more.htm>.
- Stuart Dredge, “Steve Jobs resisted third-party apps on iPhone, biography reveals,” The Guardian, October 24, 2011, available at <https://www.theguardian.com/technology/appsblog/2011/oct/24/steve-jobs-apps-iphone>.
- Thomas Whitehead, “Nintendo eShop Growth Continues With Massive Increase to Digital Sales,” Nintendo Life, May 6, 2021, available at [https://www.nintendolife.com/news/2021/05/nintendo\\_eshop\\_growth\\_continues\\_with\\_massive\\_increase\\_to\\_digital\\_sales](https://www.nintendolife.com/news/2021/05/nintendo_eshop_growth_continues_with_massive_increase_to_digital_sales).
- Thomas Whitehead, “Sky: Children Of The Light Is Now Available For Free On Switch eShop,” Nintendo Life, June 29, 2021, available at [https://www.nintendolife.com/news/2021/06/sky\\_children\\_of\\_the\\_light\\_is\\_now\\_available\\_for\\_free\\_on\\_switch\\_eshop](https://www.nintendolife.com/news/2021/06/sky_children_of_the_light_is_now_available_for_free_on_switch_eshop).
- Todd Spangler, “HBO Max with Ads Launches: What’s Different in the \$10 Monthly Plan,” Variety, June 2, 2021, available at <https://variety.com/2021/digital/news/hbo-max-with-ads-launch-pricing-1234986422/>.
- Tom Marks, “Report: Steam’s 30% Cut Is Actually the Industry Standard,” January 13, 2020, IGN, available at <https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard>.
- Tom Warren, “Microsoft is bringing Android apps to Windows 11 with Amazon’s Appstore,” The Verge, June 24, 2021, available at <https://www.theverge.com/2021/6/24/22548428/microsoft-windows-11-android-apps-support-amazon-store>.
- Tom Warren, “Microsoft shakes up PC gaming by reducing Windows store cut to just 12 percent,” The Verge, April 29, 2021, available at <https://www.theverge.com/2021/4/29/22409285/microsoft-store-cut-windows-pc-games-12-percent>.

- Tom Warren, “Windows Store rebranded to Microsoft Store in Windows 10,” The Verge, September 22, 2017, available at <https://www.theverge.com/2017/9/22/16348986/microsoft-store-windows-10-app-store>.
- Tyler Wilde, “Unreal Engine games no longer owe royalties on their first \$1M in revenue,” PC Gamer, May 13, 2020, available at <https://www.pcgamer.com/unreal-engine-games-no-longer-owe-royalties-on-their-first-dollar1m-in-revenue/>.
- Wes Fenlon and Tyler Wilde, “PC Game Storefronts Compared: What You Need To Know About Retailers And Resellers,” PC Gamer, July 12, 2019, available at <https://www.pcgamer.com/pc-game-storefronts-compared-what-you-need-to-know-about-retailers-and-resellers/>.
- Venture Beat, “Funplus Group Sells Its Game Subsidiary to Chinese Holding Company For \$960M,” available at <https://venturebeat.com/2014/08/19/funplus-group-sells-its-game-subsidiary-to-chinese-holding-company-for-960m/>.
- Zackery Cuevas, “Can You Play Roblox Without Downloading It?” Android Central, October 15, 2020, available at <https://www.androidcentral.com/can-you-play-roblox-without-downloading>.

### **SEC Filings and Annual Reports**

- Lions Gate Entertainment Corp., SEC Form 10-K for the period ended December 31, 2020.
- Netflix, Inc., SEC Form 10-Qs
- Netflix, Inc., SEC Form 10-Ks
- The Walt Disney Company, SEC Form 10-K for the period ended December 31, 2020.
- The Walt Disney Company, SEC Form 10-K for period ended October 3, 2020.
- Apple Inc., Form 10-K for the fiscal year ended September 26, 2020.
- Facebook, Inc., SEC Form 10-K for the period ended December 31, 2020.
- ViacomCBS Inc., SEC Form 10-K for the period ended December 31, 2020.
- Playtika Holding Corp., SEC Form S-1, filed on December 18, 2020.
- Alphabet Inc., SEC Form 10-K for the period ended December 31, 2020.
- AT&T Inc., SEC Form 10-K for the period ended December 31, 2020, filed on February 25, 2021.
- Netflix, Inc., SEC Form 10-K for the period ended December 31, 2020.

- Amazon.com, Inc., SEC Form 10-K for the period ended December 31, 2020.
- CBS Corporation, SEC Form 10-K for the period ended December 31, 2020.
- Fox Corporation, SEC Form 10-K for the period ended December 31, 2020.
- Comcast Corporation, SEC Form 10-K for period ended December 31, 2020, filed on February 3, 2021.

### Webpages

- 9to5Mac, “Jobs’ original vision for the iPhone: No third-party native apps,” October 21, 2011, available at <https://9to5mac.com/guides/iphone-2g/>.
- Activision Blizzard, “Activision | Blizzard,” available at <https://activisionblizzard.com/home>.
- Affinity, “Let’s Get Technical,” available at <https://affinity.serif.com/en-us/photo/full-feature-list/>.
- Amazon Appstore, “Device Filtering and Compatibility,” May 14, 2021, available at <https://developer.amazon.com/docs/app-submission/device-filtering-and-compatibility.html>.
- Amazon Appstore, “Why Developers are Choosing Amazon Appstore,” available at <https://developer.amazon.com/apps-and-games>.
- Amazon Developer, “Amazon Developer Services Agreement,” June 9, 2021, available at <https://developer.amazon.com/support/legal/da>.
- Amazon, “Amazon Music Unlimited,” available at <https://www.amazon.com/music/unlimited>.
- Amazon, “Appstore for Android,” available at <https://www.amazon.com/mobile-apps/b?ie=UTF8&node=2350149011>.
- Amazon, “Candy Crush Saga,” available at [https://www.amazon.com/King-Candy-Crush-Saga/dp/B00FAPF5U0/ref=sr\\_1\\_1?dchild=1&qid=1627065249&refinements=p\\_4%3AKing&s=mobile-apps&search-type=ss&sr=1-1](https://www.amazon.com/King-Candy-Crush-Saga/dp/B00FAPF5U0/ref=sr_1_1?dchild=1&qid=1627065249&refinements=p_4%3AKing&s=mobile-apps&search-type=ss&sr=1-1).
- Amazon, “Clash of Clans – Hay Day – Hay Day YouTube,” available at [https://www.amazon.com/s?i=mobile-apps&rh=p\\_4%3ASupercell+ltd&search-type=ss](https://www.amazon.com/s?i=mobile-apps&rh=p_4%3ASupercell+ltd&search-type=ss).
- Amazon, “Coin Master,” available at [https://www.amazon.com/Moon-Active-Coin-Master/dp/B071P6S2FL/ref=sr\\_1\\_1?dchild=1&qid=1627318397&refinements=p\\_4%3AMoon+Active&s=mobile-apps&searchC-type=ss&sr=1-1](https://www.amazon.com/Moon-Active-Coin-Master/dp/B071P6S2FL/ref=sr_1_1?dchild=1&qid=1627318397&refinements=p_4%3AMoon+Active&s=mobile-apps&searchC-type=ss&sr=1-1).

- Amazon, “Guns of Glory,” available at [https://www.amazon.com/Funplus-Game-Guns-of-Glory/dp/B07QBP8SXJ/ref=sr\\_1\\_1?dchild=1&keywords=guns+of+glory&qid=1628526528&s=mobile-apps&sr=1-1](https://www.amazon.com/Funplus-Game-Guns-of-Glory/dp/B07QBP8SXJ/ref=sr_1_1?dchild=1&keywords=guns+of+glory&qid=1628526528&s=mobile-apps&sr=1-1).
- Amazon, “Help & Customer Service: About the Amazon Appstore,” available at <https://www.amazon.com/gp/help/customer/display.html?nodeId=GP96AU3MQ58F MV8U>.
- Amazon, “Homescapes,” available at [https://www.amazon.com/Playrix-Homescapes/dp/B0739V781Z/ref=sr\\_1\\_1?dchild=1&qid=1627319310&refinements=p\\_4%3APlayrix&s=mobile-apps&search-type=ss&sr=1-1](https://www.amazon.com/Playrix-Homescapes/dp/B0739V781Z/ref=sr_1_1?dchild=1&qid=1627319310&refinements=p_4%3APlayrix&s=mobile-apps&search-type=ss&sr=1-1).
- Amazon, “Minecraft,” available at <https://www.amazon.com/Mojang-Minecraft/dp/B00992CF6W>.
- Amazon, “PUBG Mobile 1.5: Ignition,” available at [https://www.amazon.com/Tencent-Games-PUBG-MOBILE-Miramar/dp/B07KGPYY5/ref=sr\\_1\\_1?dchild=1&qid=1628498404&refinements=p\\_4%3ATencent+Games&s=mobile-apps&sr=1-1](https://www.amazon.com/Tencent-Games-PUBG-MOBILE-Miramar/dp/B07KGPYY5/ref=sr_1_1?dchild=1&qid=1628498404&refinements=p_4%3ATencent+Games&s=mobile-apps&sr=1-1).
- Amazon, “Roblox,” available at <https://www.amazon.com/Roblox-Corporation/dp/B00NUF4YOA>.
- Amazon, “Slotomania Free Slots & Casino Games – Play Las Vegas Slot Machines Online,” available at [https://www.amazon.com/Slotomania-Free-Slots-Casino-Games/dp/B007TBAQCK/ref=sr\\_1\\_1?dchild=1&qid=1627318292&refinements=p\\_4%3APlaytika+LTD&s=mobile-apps&search-type=ss&sr=1-1](https://www.amazon.com/Slotomania-Free-Slots-Casino-Games/dp/B007TBAQCK/ref=sr_1_1?dchild=1&qid=1627318292&refinements=p_4%3APlaytika+LTD&s=mobile-apps&search-type=ss&sr=1-1).
- Amazon, “The Complete Book of Baby Names: The Most Names (100,001+), Most Unique Names, Most Idea-Generating Lists (600+) and the Most Help to Find the Perfect Name,” available at <http://www.amazon.com/Complete-Book-Baby-Names-Idea-Generating/dp/1402224559>.
- Amazon, “The Weather Channel: Forecast, Radar & Alerts,” available at [https://www.amazon.com/Weather-Channel-Forecast-Radar-Alerts/dp/B0064X7FVE/ref=sr\\_1\\_1](https://www.amazon.com/Weather-Channel-Forecast-Radar-Alerts/dp/B0064X7FVE/ref=sr_1_1).
- Amazon, “Toy Blast,” available at <https://www.amazon.com/Peak-Games-Toy-Blast/dp/B00T9WFIO8>.
- Android Developers, “Download Android Studio and SDK Tools,” available at <https://developer.android.com/studio>.
- App Annie, “The State of Mobile 2021,” available at <https://www.appannie.com/en/go/state-of-mobile-2021/>.
- App Annie, “Top Apps on iOS, United States, Lifestyle,” July 26, 2021, available at <https://www.appannie.com/en/apps/ios/top/united-states/lifestyle/iphone/>.

- Apple “App Store Preview: Minecraft,” available at <https://apps.apple.com/us/app/minecraft/id479516143>.
- Apple Developer, “3. Distribute your application,” archived on December 4, 2008, available at <http://developer.apple.com/iphone/program/distribute.html>.
- Apple Developer, “App Review,” available at <https://developer.apple.com/app-store/review/>.
- Apple Developer, “App Store Review Guidelines,” June 7, 2021, available at <https://developer.apple.com/app-store/review/guidelines/>.
- Apple Developer, “App Store Small Business Program,” available at <https://developer.apple.com/app-store/small-business-program/>.
- Apple Developer, “Apple Developer Enterprise Program,” available at <https://developer.apple.com/programs/enterprise/>.
- Apple Developer, “Apple Video Partner Program,” available at <https://developer.apple.com/programs/video-partner/>.
- Apple Developer, “Auto-renewable Subscriptions,” available at <https://developer.apple.com/app-store/subscriptions/>.
- Apple Developer, “Choosing a Business Model,” available at <https://developer.apple.com/app-store/business-models/>.
- Apple Developer, “Choosing a Category,” available at <https://developer.apple.com/app-store/categories/>.
- Apple Developer, “Choosing a Membership,” available at <https://developer.apple.com/support/compare-memberships/>.
- Apple Developer, “Introducing SwiftUI,” available at <https://developer.apple.com/tutorials/SwiftUI>.
- Apple Developer, “Mac App Store,” available at <https://web.archive.org/web/20110320225841/http://developer.apple.com/programs/mac/distribution.html>.
- Apple Developer, “Membership Details,” available at <https://developer.apple.com/programs/whats-included/>.
- Apple Developer, “Metal,” available at <https://developer.apple.com/metal>.
- Apple Developer, “Promoting your apps,” available at <https://developer.apple.com/app-store/promote/>.
- Apple Developer, “Protecting the User’s Privacy,” available at [https://developer.apple.com/documentation/uikit/protecting\\_the\\_user\\_s\\_privacy](https://developer.apple.com/documentation/uikit/protecting_the_user_s_privacy).

- Apple Developer, “Swift,” available at <https://developer.apple.com/swift/>.
- Apple Developer, “Working with Metal: Overview,” Apple, “App Store Preview: Amazon Music: Songs & Podcasts,” available at <https://apps.apple.com/us/app/amazon-music-songs-podcasts/id510855668>.
- Apple, “App Store Preview: AMZN Mobile LLC,” available at <https://apps.apple.com/us/developer/amzn-mobile-llc/id297606954>.
- Apple, “App Store Preview: Basketball Training,” available at <https://apps.apple.com/us/app/basketball-training/id738165126?form=MY01SV&OCID=MY01SV>.
- Apple, “App Store Preview: Bejeweled Stars,” available at <https://apps.apple.com/us/app/bejeweled-stars/id974135847>.
- Apple, “App Store Preview: Bubtag,” available at <https://apps.apple.com/us/app/bubtag/id1229009366?form=MY01SV&OCID=MY01SV>.
- Apple, “App Store Preview: Double Down Interactive LLC,” available at <https://apps.apple.com/us/developer/double-down-interactive-llc/id485126027>.
- Apple, “App Store Preview: FIFA Soccer,” available at <https://apps.apple.com/us/app/fifa-soccer/id1094930513>.
- Apple, “App Store Preview: Flower,” available at <https://apps.apple.com/us/app/flower/id1279174518>.
- Apple, “App Store Preview: Google LLC,” available at <https://apps.apple.com/us/developer/google-llc/id281956209>.
- Apple, “App Store Preview: HBO Max: Stream TV & Movies,” available at <https://apps.apple.com/us/app/hbo-max-stream-tv-movies/id971265422>.
- Apple, “App Store Preview: Hulu: Stream movies & TV shows,” available at <https://apps.apple.com/us/app/hulu-stream-movies-tv-shows/id376510438>.
- Apple, “App Store Preview: iHeart: Radio, Music, Podcasts,” available at <https://apps.apple.com/us/app/iheart-radio-music-podcasts/id290638154>.
- Apple, “App Store Preview: Jump Higher – Learn to Dunk,” available at <https://apps.apple.com/us/app/jump-higher-learn-to-dunk/id739500884>.
- Apple, “App Store Preview: Lil’ BabyNames,” available at <https://apps.apple.com/us/app/lil-babynames/id1015004770>.
- Apple, “App Store Preview: Microsoft Solitaire Collection,” available at <https://apps.apple.com/us/app/microsoft-solitaire-collection/id1103438575>.

- Apple, “App Store Preview: Name My Kid,” available at <https://apps.apple.com/us/app/name-my-kid/id1315240913>.
- Apple, “App Store Preview: OurTime - Meet 50+ Singles,” available at <https://apps.apple.com/us/app/ourtime-meet-50-singles/id1009499048>.
- Apple, “App Store Preview: Plenty of Fish Dating,” available at <https://apps.apple.com/us/app/plenty-of-fish-dating/id389638243>.
- Apple, “App Store Preview: Roblox,” available at <https://apps.apple.com/us/app/roblox/id431946152>.
- Apple, “App Store Preview: Ticketmaster – Buy, Sell Tickets,” available at <https://apps.apple.com/us/app/ticketmaster-buy-sell-tickets/id500003565>.
- Apple, “App Store Preview: TIDAL Music,” available at <https://apps.apple.com/us/app/tidal-music/id913943275>.
- Apple, “App Store Preview: Weather – The Weather Channel,” available at <https://apps.apple.com/us/app/weather-the-weather-channel/id295646461>.
- Apple, “App Store Preview: YouTube Music,” available at <https://apps.apple.com/us/app/youtube-music/id1017492454>.
- Apple, “App Store Principles and Practices,” available at <https://www.apple.com/mz/ios/app-store/principles-practices/>.
- Apple, “App Store,” available at <https://www.apple.com/app-store/>.
- Apple, “Apple Music,” available at <https://www.apple.com/apple-music/>.
- Apple, “Change your subscription from Apple,” available at <https://support.apple.com/en-us/HT204939>.
- Apple, “Download Apps and Games on Your iPhone or iPad,” available at <https://support.apple.com/en-us/HT204266>.
- Apple, “Download Apps from the App Store on Your Mac,” available at <https://support.apple.com/en-us/HT203421>.
- Apple, “Family Sharing,” available at <https://www.apple.com/family-sharing/>.
- Apple, “iCloud,” available at <https://www.apple.com/icloud>.
- Apple, “iOS 14,” available at <https://www.apple.com/ios/ios-14/>.
- Apple, “iPadOS,” available at <https://www.apple.com/ipados/ipados-14/>.
- Apple, “macOS Big Sur,” available at <https://www.apple.com/macos/big-sur/>.
- Apple, “OS X: The Mac App Store,” available at <https://www.apple.com/uk/osx/apps/app-store/>.



- Apple, “Principles and Practices,” available at <https://www.apple.com/ios/app-store/principles-practices/>.
- Apple, “Redownload apps and games from Apple,” available at <https://support.apple.com/en-us/HT211841>.
- Apple, “Safely open apps on your Mac,” April 30, 2021, available at <https://support.apple.com/en-us/HT202491>.
- Apple, “TV,” available at <https://www.apple.com/tv>.
- Apple, “watchOS 7,” available at <https://www.apple.com/watchos/watchos-7/>.
- Apple, “What is Sign in with Apple?” September 16, 2020, available at <https://support.apple.com/en-us/HT210318>.
- AT&T, “Top entertainment + reliable internet on 1 bill,” available at <https://www.att.com/bundles/directv-internet/>.
- Barnes and Noble, “100000+ Baby Names: The Most Helpful, Complete, & Up-to-Date Name Book,” available at [http://www.barnesandnoble.com/w/100000-baby-names-bruce-lansky/1122403152\\_](http://www.barnesandnoble.com/w/100000-baby-names-bruce-lansky/1122403152_).
- Battle Net, “Shop,” available at <https://us.shop.battle.net/en-us>.
- Champions Academy, “Minecraft Mods,” available at <https://www.championsacademyinfo.com.au/minecraft-mods.html>.
- Computer Hope, “PalmPilot,” December 16, 2018, available at <https://www.computerhope.com/jargon/p/palmpilot.htm>.
- Delisted Games, “Discord Nitro Games,” October 16, 2019, available at <https://delistedgames.com/discord-nitro-games/>.
- Discord, “How to Get Your Game on Discord,” available at <https://discord.com/developers/docs/game-and-server-management/how-to-get-your-game-on-discord>.
- Dubit, “Dubit Guide to Roblox for Brands: Version 3.0,” 2020, available at <https://docsend.com/view/ytafca42a83pbqg>.
- EA Sports, “Apex Legends – Select Your Platform,” available at <https://www.ea.com/games/apex-legends/play-now-for-free>.
- EA Sports, “Apex Legends Mobile Regional Betas Start Soon,” available at <https://www.ea.com/games/apex-legends/news/apex-legends-mobile-regional-betas>.
- EA Sports, “FIFA 21 Standard Edition on PC,” available at <https://www.ea.com/games/fifa/fifa-21/buy/pc>.
- Electronic Arts, “Electronic Arts,” available at <https://www.ea.com/>.

- Electronic Arts Help, “Where to buy EA PC digital download games,” November 8, 2019, available at <https://help.ea.com/en-us/help/faq/where-to-buy-ea-games-v2/>.
- eMarketer, “US Smartphone Users and Penetration, by OS,” available at <https://www.emarketer.com/forecasts/584b26021403070290f93a22/5851918b0626310a2c186ae7>,
- Epic Games, “Day 1 Ready: Fortnite Arrives Next Week on Xbox Series X|S and PS5,” December 17, 2020, available at <https://www.epicgames.com/fortnite/en-US/news/day-1-ready-fortnite-arrives-next-week-on-xbox-series-x-s-and-ps5>.
- Epic Games, “Epic Games Store 2020 Year in Review,” January 28, 2021, available at <https://www.epicgames.com/store/en-US/news/epic-games-store-2020-year-in-review>.
- Epic Games, “Epic Games,” available at <https://www.epicgames.com/site/en-US/home>.
- Epic Games, “Fortnite Crew: the Ultimate Fortnite Offer,” available at <https://www.epicgames.com/fortnite/en-US/fortnite-crew-subscription>.
- Epic Games, “Frequently Asked Questions,” June 23, 2021, available at <https://www.epicgames.com/site/en-US/epic-games-store-faq>.
- Epic Games, “Store,” available at <https://www.epicgames.com/store/en-US/browse?sortBy=releaseDate&sortDir=DESC&count=40&start=0>.
- Epic Games, “What Platforms or Devices Are Compatible with Fortnite?” available at <https://www.epicgames.com/help/en-US/fortnite-c75/technical-support-c118/what-platforms-or-devices-are-compatible-with-fortnite-a6693>.
- Equinix, “A better App Store Pricing Matrix,” January 24, 2019, available at <https://www.equinix.com/us/appdevelopers/pricematrix.html>.
- Facebook for Developers, “Facebook Login Overview,” available at <https://developers.facebook.com/docs/facebook-login/overview>.
- Fortnite Wiki, “Wegame,” available at <https://fortnite.gamepedia.com/Wegame>.
- FromSoftware, “Sekiro: Shadows Die Twice,” available at <https://www.fromsoftware.jp/ww/>.
- FunPlus, “Century Studios,” available at <https://www.funplus.com/century-studios/>.
- GamesIndustry International, “Microsoft Unveils Xbox Live Marketplace Content Available at Launch of Xbox 360,” November 15, 2005, available at <https://www.gamesindustry.biz/articles/microsoft-unveils-xbox-live-marketplace-content-available-at-launch-of-xbox-360>.

- GOG Developer Docs, “Welcome to GOG GALAXY!” June 5, 2014, available at <https://docs.gog.com/introduction/>.
- GOG.com, “Browse All Games,” available at <https://www.gog.com/games?sort=popularity&page=1>.
- GOG.com, “About GOG.com,” available at [https://www.gog.com/about\\_gog](https://www.gog.com/about_gog).
- Google Account Help, “Use Your Google Account to Sign in to Other Apps or Services,” available at <https://support.google.com/accounts/answer/112802>.
- Google Play Console Help, “Create sales for paid apps,” available at <https://support.google.com/googleplay/android-developer/answer/7271135>.
- Google Play, “Games,” available at [https://play.google.com/store/apps/category/GAME?hl=en\\_US&gl=US](https://play.google.com/store/apps/category/GAME?hl=en_US&gl=US).
- Google Play, “Supported Devices,” available at <https://support.google.com/googleplay/answer/1727131?hl=en>.
- Google Play Console Help, “How to use Play Console,” available at <https://support.google.com/googleplay/android-developer/answer/6112435?hl=en#zippy=%2Cstep-pay-registration-fee>.
- Google Play Console, “Play Media Experience Program,” available at <https://play.google.com/console/about/mediaprogram/>.
- Google Play, “Angry Birds Classic,” available at [https://play.google.com/store/apps/details?id=com.rovio.angrybirds&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.rovio.angrybirds&hl=en_US&gl=US).
- Google Play, “Bejeweled Stars – Free Match 3,” available at [https://play.google.com/store/apps/details?id=com.ea.gp.bejeweledskies&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.ea.gp.bejeweledskies&hl=en_US&gl=US).
- Google Play, “FIFA Soccer,” available at [https://play.google.com/store/apps/details?id=com.ea.gp.fifamobile&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.ea.gp.fifamobile&hl=en_US&gl=US).
- Google Play, “Microsoft Solitaire Collection – Apps on Google Play,” available at [https://play.google.com/store/apps/details?id=com.microsoft.microsoftsolitairecollection&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.microsoft.microsoftsolitairecollection&hl=en_US&gl=US).
- Google Play, “Minecraft,” available at [https://play.google.com/store/apps/details?id=com.mojang.minecraftpe&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.mojang.minecraftpe&hl=en_US&gl=US).
- Google Play, “Weather Radar & Live Widget: The Weather Channel,” available at [https://play.google.com/store/apps/details?id=com.weather.Weather&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.weather.Weather&hl=en_US&gl=US).

- Google, “Play Console Help: Change to Google Play’s service fee in 2020,” available at <https://support.google.com/googleplay/android-developer/answer/10632485?hl=en>.
- HBO Max, “HBO Max,” available at <https://www.hbomax.com>.
- Hitman 3, “Hitman III – Deluxe Edition – Available Now,” available at <https://hitman.com/global/buy/>.
- <https://na.wargaming.net/en/games/wotb> and <https://na.wargaming.net/en/games/moo>
- Hulu, “Hulu Gift Cards,” July 10, 2021, available at <https://help.hulu.com/s/article/gift-cards>.
- Hulu, “Supported devices,” available at <https://help.hulu.com/s/article/supported-devices>.
- Hulu, “What are the costs and commitments for Hulu?” available at <https://help.hulu.com/s/article/how-much-does-hulu-cost>.
- HumbleBundle, “Humble Widget,” available at <https://www.humblebundle.com/developer/widget>.
- iHeart, “Home Page,” available at <https://www.iheart.com/>.
- Jackbox Games, “The Jackbox Party Pack 3,” available at <https://www.jackboxgames.com/party-pack-three/>.
- Jagex, “Space Punks,” available at <https://www.playspacepunks.com/>.
- Jody Macgregor, “Tencent launches it WeGame client outside China,” PC Gamer, April 7, 2019, available at <https://www.pcgamer.com/tencent-have-launched-their-wegame-client-outside-china>.
- King, “Can I Move My Game Progress onto A New Device?” May 6, 2021, available at <https://community.king.com/en/blog/kb/articles/393-can-i-move-my-game-progress-onto-a-new-device>.
- King, “Candy Crush Saga,” available at <https://www.king.com/game/candycrush>.
- King, “What Are Gold Bars Used For?” May 6, 2021, available at <https://community.king.com/en/blog/kb/articles/596-what-are-gold-bars-used-for>.
- Match Group, “Our Company,” available at <https://mtch.com/ourcompany>.
- Matt Brown, “Xbox Store rebranding to ‘Microsoft Store’ on Xbox One,” September 28, 2017, *Windows Central*, available at <https://www.windowscentral.com/xbox-store-rebranded-microsoft-store>.
- Metacritic, “Bejeweled 3,” available at <https://www.metacritic.com/game/ds/bejeweled-3>.

- Microsoft Store, “2021 App Developer Agreement,” June 28, 2021, available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4OG2b>.
- Microsoft Store, “App Developer Agreement,” July 10, 2020, available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4o4bH>.
- Microsoft, “Bejeweled Blitz LIVE,” available at <https://marketplace.xbox.com/en-US/Product/Bejeweled-Blitz-LIVE/66acd000-77fe-1000-9115-d80258410a57#>.
- Microsoft, “ESPN Xbox,” available at <https://www.microsoft.com/en-us/p/espn-xbox/9nb4d3vwkb55?activetab=pivot:overviewtab>.
- Microsoft, “FIFA 21 Standard Edition Xbox One & Xbox Series X|S,” available at <https://www.microsoft.com/en-us/p/FIFA21StandardEditionXboxOneXboxSeriesXS/9NN50LXZT18Z?rtc=1&activetab=pivot:overviewtab>.
- Microsoft, “Microsoft 365 and Office Resources,” available at <https://www.microsoft.com/en-us/microsoft-365/microsoft-365-and-office-resources/?rtc=1#coreui-heading-5dcqxz4>.
- Microsoft, “Minecraft: Xbox 360 Edition,” Xbox 360 Marketplace, available at <https://marketplace.xbox.com/en-US/Product/Minecraft-Xbox-360-Edition/66acd000-77fe-1000-9115-d802584111f7>.
- Microsoft, “Netflix,” available at <https://www.microsoft.com/en-us/p/netflix/9wzdnrcfj3tj?activetab=pivot:overviewtab>.
- Microsoft, “Netflix,” available at [https://www.microsoft.com/en-us/p/netflix/9wzdnrcfj3tj?cid=msft\\_web\\_appsforwindowsphone\\_collection](https://www.microsoft.com/en-us/p/netflix/9wzdnrcfj3tj?cid=msft_web_appsforwindowsphone_collection).
- Microsoft, “Set and schedule app pricing,” October 31, 2018, available at <https://docs.microsoft.com/en-us/windows/uwp/publish/set-and-schedule-app-pricing>.
- Microsoft, “Shop Business: Visual Studio Professional 2019,” available at <https://www.microsoft.com/en-us/d/visual-studio-professional-2019/dg7gmgf0f6q1?activetab=pivot%3aoverviewtab>.
- Microsoft, “Spotify | Xbox,” available at <https://www.microsoft.com/en-us/p/spotify-xbox/9nfq49h668tb?activetab=pivot:overviewtab>.
- Microsoft, “Windows Apps,” available at <https://www.microsoft.com/en-us/store/apps/windows>.
- Microsoft, “Windows Developer: Account types, locations, and fees,” available at <https://docs.microsoft.com/en-us/windows/uwp/publish/account-types-locations-and-fees>.

- Microsoft, “Windows Developer: Category and subcategory table,” available at <https://docs.microsoft.com/en-us/windows/uwp/publish/category-and-subcategory-table>.
- Minecraft, “Minecraft: How Do You Want to Play?” available at <https://www.minecraft.net/en-us/get-minecraft>.
- Minecraft, “Where Can I Buy Minecraft Java Edition?” available at <https://help.minecraft.net/hc/en-us/articles/360035131351-Where-can-I-buy-Minecraft-Java-Edition>.
- Mohawk Games, “Old World,” available at <https://mohawkgames.com/oldworld/>.
- Moon Active, “The Fun Side of the Moon,” available at <https://www.moonactive.com/>.
- Muhammad Imran Habib, “How to Install Un-Verified App on Windows 10,” AvoidErrors, August 31, 2018, available at <https://www.avoiderrors.com/how-to-install-un-verified-app-on-windows-10/>.
- Netflix, “Choose your plan,” available at <https://www.netflix.com/signup>.
- Netflix, “Help Center: Can’t find the Netflix app in app stores,” available at <https://help.netflix.com/en/node/12983>.
- Netflix, “Help Center: How to download the Netflix app,” available at <https://help.netflix.com/en/node/101653>.
- Netflix, “Netflix Gift Cards,” available at <https://help.netflix.com/en/node/32950>.
- Niantic, “The Games Redefining Our Reality,” available at <https://nianticlabs.com/en/products/>.
- Nintendo, “Fortnite,” available at <https://www.nintendo.com/games/detail/fortnite-switch/>.
- Nintendo, “Game Store,” available at <https://www.nintendo.com/games/buy-digital/>.
- Nintendo, “Hulu,” available at <https://www.nintendo.com/games/detail/hulu-switch>.
- Nintendo, “Legacy Edition – FIFA 21,” available at <https://www.nintendo.com/games/detail/fifa-21-nintendo-switch-legacy-edition-switch/>.
- Nintendo, “Nintendo,” available at <https://store.nintendo.com/>.
- NVIDIA, “GeForce Now – System Requirements,” available at <https://www.nvidia.com/en-us/geforce-now/system-reqs/>.
- Oculus, “Quest Store: VR Games, Apps, & More,” available at <https://www.oculus.com/experiences/quest/>.

- Oculus, “Search ‘Rift Experiences,’” available at <https://www.oculus.com/experiences/rift/search>.
- Origin, “Store,” available at <https://www.origin.com/usa/en-us/store>.
- Pandora, “View Plans,” available at <https://www.pandora.com/plans>.
- Peak, “Our Products,” available at <https://peak.com/products>.
- Pew Research Center, “Mobile Fact Sheet,” April 7, 2021, available at <https://www.pewresearch.org/internet/fact-sheet/mobile/>.
- Phoenix Labs, “Dauntless,” available at <https://playdauntless.com/>.
- Playrix, “Homescapes,” available at <https://www.playrix.com/en/games/homescapes>.
- Playrix, “Our Games Are Vibrant Worlds with Charming Characters,” available at <https://www.playrix.com/en/games>.
- Playrix, “Terms of Use,” January 29, 2021, available at <https://www.playrix.com/en/terms/index.html>.
- Playrix, “Township,” available at <https://www.playrix.com/en/games/township>.
- PlayStation Store, “All PS4 Games,” available at <https://store.playstation.com/en-us/category/85448d87-aa7b-4318-9997-7d25f4d275a4/1>.
- PlayStation Store, “All PS5 Games,” available at <https://store.playstation.com/en-us/category/d71e8e6d-0940-4e03-bd02-404fc7d31a31/1>.
- PlayStation.Store, “FIFA 21 Standard Edition PS4™ & PS5™,” available at [https://store.playstation.com/en-us/product/UP0006-PPSA01327\\_00-FIFAFOOTBALL2021/](https://store.playstation.com/en-us/product/UP0006-PPSA01327_00-FIFAFOOTBALL2021/).
- Pokemon Go, “Welcome, Trainers!” available at <https://pokemongolive.com/en/>.
- RedHat, “What is an SDK?” available at <https://www.redhat.com/en/topics/cloud-native-apps/what-is-SDK>.
- Reuters, “Apple Inc. APPL.O,” available at <https://www.reuters.com/companies/AAPL.O>.
- Roblox, “3 Years of Metal,” May 21, 2020, available at <https://blog.roblox.com/2020/05/3-years-metal/>.
- Roblox, “Buy Robux,” available at <https://www.roblox.com/upgrades/robux>.
- Roblox, “How to Install and Play Roblox Using Browser,” available at <https://en.help.roblox.com/hc/en-us/articles/204473560-How-to-Install-and-Play-Roblox-Using-Browser>.



- Roblox, “Roblox VR,” available at <https://en.help.roblox.com/hc/en-us/articles/208260046-Roblox-VR>.
- Rocket League, “Season 4 Coming August 11,” available at <https://www.rocketleague.com/>.
- Roku, “Channel Store,” available at <https://channelstore.roku.com/browse/apps>.
- Samsung Developers, “Galaxy Store Games,” available at <https://developer.samsung.com/galaxy-games>.
- Samsung Galaxy Store Seller Portal, “Terms and Conditions,” available at <https://seller.samsungapps.com/help/termsAndConditions.as>.
- Samsung Galaxy Store, “Free Slots Casino - House of Fun,” available at <http://galaxystore.samsung.com/detail/com.pacificinteractive.HouseOfFun>.
- Samsung Galaxy Store, “Guns of Glory: The Iron Mask,” available at <http://galaxystore.samsung.com/detail/com.funplus.gog.flexion>.
- Samsung Galaxy Store, “Homescapes,” available at <http://galaxystore.samsung.com/detail/com.playrix.homescapes.samsung>.
- Samsung Galaxy Store, “Pokémon GO,” available at <http://galaxystore.samsung.com/detail/com.nianticlabs.pokemongo.ares>.
- Samsung Galaxy Store, “PUBG Mobile 1.5: Ignition,” available at [https://galaxystore.samsung.com/detail/com.tencent.ig?session\\_id=W\\_40c67c80fa377804a160cf6b48697459](https://galaxystore.samsung.com/detail/com.tencent.ig?session_id=W_40c67c80fa377804a160cf6b48697459).
- Samsung Galaxy Store, “The Weather Channel for Samsung,” available at <http://galaxystore.samsung.com/detail/com.weather.samsung>.
- Samsung Galaxy Store, “Wheel of Fortune: Free Play,” available at <https://galaxystore.samsung.com/detail/com.scopely.flexion.wheeloffortune>.
- Samsung, “Apps on your Samsung smart TV,” available at <https://www.samsung.com/us/support/answer/ANS00062169/>.
- Scopely, “Games,” available at <https://scopely.com/games/>.
- Scopely, “The Walking Dead: Road to Survival,” available at <https://scopely.com/game/the-walking-dead/>.
- Sensor Tower, “Top Charts: iPhone - US - Games,” available at <https://sensortower.com/ios/rankings/top/iphone/us/games>.
- Setapp, “Annual Mac Developer Survey,” 2019, available at <https://cdn.setapp.com/blog/images/Annual-Setapp-Mac-Market-Survey-2019.pdf>.

- Social Security, “Popular Baby Names,” available at <http://www.ssa.gov/oact/babynames/>.
- Soundcloud, “Discover more with SoundCloud Go+,” available at <https://checkout.soundcloud.com/go>.
- Spotify, “Apple payments for Spotify,” available at <https://support.spotify.com/us/article/apple-payments/>.
- Square Enix, “Kingdom Hearts,” available at <https://www.kingdomhearts.com/home/us/>.
- Square Enix, “Kingdome Hearts HD 1.5+2.5 ReMix,” available at [https://www.kingdomhearts.com/1525/us/?\\_ga=2.178043877.1514901067.1628462450-1744302014.1628462450](https://www.kingdomhearts.com/1525/us/?_ga=2.178043877.1514901067.1628462450-1744302014.1628462450).
- Stadia, “FIFA 21,” available at <https://stadia.google.com/games/fifa-21>.
- Star Wars Jedi Fallen Order, “Get Star Wars Jedi: Fallen Order,” available at <https://www.ea.com/games/starwars/jedi-fallen-order/buy>.
- Statista, “Distribution of free and paid Android apps in the Google Play Store as of July 2021,” available at <https://www.statista.com/statistics/266211/distribution-of-free-and-paid-android-apps/>.
- Statista, “Number of apps available in leading app stores as of 1<sup>st</sup> quarter 2021,” available at <https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>. Steam Games, “Steam Keys,” available at <https://partner.steamgames.com/doc/features/keys>.
- Steam, “Games on Steam,” available at <https://store.steampowered.com/games>.
- Steam, “macOS on Steam,” available at <https://store.steampowered.com/macOS>.
- Steam, “Sekiro,” available at [https://store.steampowered.com/app/814380/Sekiro\\_Shadows\\_Die\\_Twice\\_\\_GOTY\\_Edition/](https://store.steampowered.com/app/814380/Sekiro_Shadows_Die_Twice__GOTY_Edition/).
- Steampowered, “Top Sellers: All Products,” available at <https://web.archive.org/web/20210401152402/https://store.steampowered.com/search/?filter=topsellers>.
- Steamspy, “Games released in free genre,” available at <https://steamspy.com/genre/Free>.
- Steamworks, “Home Page,” available at <https://partner.steamgames.com/>.
- Steamworks, “Steam App Fee,” available at <https://partner.steamgames.com/doc/gettingstarted/appfee>.

- Steamworks, “Steamworks Documentation: Review Process,” available at [https://partner.steamgames.com/doc/store/review\\_process](https://partner.steamgames.com/doc/store/review_process).
- Steamworks, “Steamworks Documentation: Steam DRM,” available at <https://partner.steamgames.com/doc/features/drm>.
- Supercell, “Clash of Clans,” available at <https://supercell.com/en/games/clashofclans/>.
- Supercell, “Games,” available at <https://supercell.com/en/games/>.
- Team AndroidAdvices, “Remove Android:Plankton [PUP] Virus from Android Device after Downloading Apps from GetJar,” Android Advices, available at <https://androidadvices.com/remove-androidplanktona-pup-virus-android-device-downloading-apps-getjar/>.
- The Digital Entertainment Group, “DEG Year-End 2020 Digital Media Entertainment Report,” January 26, 2021, available at [https://www.degonline.org/portfolio\\_page/deg-ye-2020-home-entertainment-report/](https://www.degonline.org/portfolio_page/deg-ye-2020-home-entertainment-report/).
- That Game Company, “Sky,” available at <https://thatgamecompany.com/sky/>.
- That Game Company, “Welcome to That Game Company,” available at <https://thatgamecompany.com/#>.
- TIDAL, “Home,” available at <https://tidal.com/>.
- TIDAL, “Subscription Types,” available at <https://support.tidal.com/hc/en-us/articles/115003662825-Subscription-Types>.
- Tom Marks, “Report: Steam’s 30% Cut Is Actually the Industry Standard,” IGN, January 13, 2020, available at <https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard>.
- Torn Banner Studios, “Buy Now,” available at <https://chivalry2.com/buy/>.
- Ubisoft, “Anno 1800,” available at <https://www.ubisoft.com/en-us/game/anno/1800#7z8vLfJQ7uT2kf8x8MH5V9>.
- Ubisoft, “Assassin’s Creed Valhalla,” available at <https://www.ubisoft.com/fr-fr/game/assassins-creed/valhalla>.
- Ubisoft, “WatchDogs Legion,” available at <https://www.ubisoft.com/en-us/game/watch-dogs/legion>.
- Unity, “Industry-leading Multiplatform Support,” available at <https://unity.com/features/multiplatform>.
- Unity, “Unity Platform,” available at <https://unity.com/products/unity-platform>.

- Unreal Engine, “Frequently Asked Questions (FAQ),” available at <https://www.unrealengine.com/en-US/faq>.
- Valve, “Valve,” available at <https://www.valvesoftware.com/en/about>.
- Viveport, “Search Results for: ‘Roblox,’” available at <https://www.viveport.com/catalogsearch/result/?q=roblox>.
- Xfinity, “Peacock,” available at <https://www.xfinity.com/peacock>.
- YouTube, “YouTube Music,” available at <https://www.youtube.com/musicpremium>.

#### **Bates Stamped Documents**

- AMZN000001494.
- AMZN000001496.
- AMZN00001491 – 3.
- APL\_APPSTORE\_09584333.
- APL-APPSTORE 10162267 – 82.
- APL-APPSTORE\_00000055 – 87.
- APL-APPSTORE\_04452013 – 5.
- APL-APPSTORE\_09126673 – 774.
- APL-APPSTORE\_10137264 – 342.
- APL-APPSTORE\_10137343 – 88.
- APL-APPSTORE\_10176241–337.
- APL-APPSTORE\_10340122 – 220.
- APL-EG\_06596359 – 62.
- APL-EG\_06596446 – 51.
- EPIC 03350282 – 290.
- EPIC\_00005143 – 6.
- EPIC\_00012739.
- EPIC\_00019291.
- EPIC\_00022192.
- EPIC\_00091478 – 82.

- EPIC\_00126800 – 49.
- EPIC\_00127277 – 97.
- EPIC\_00127293
- EPIC\_00127553 – 55.
- EPIC\_00192367 – 75.
- EPIC\_01920258 – 9.
- EPIC\_03848245 – 251.
- GOOG\_APPL\_00004102.
- GOOG-APPL-00003362 – 412.
- GOOG-APPL-00042476 – 83.
- GOOG-APPL-00044919 – 79.
- GOOG-APPL-00099190.
- GOOG-APPL-00126037 – 74.
- MSFT\_EPIC\_00000013.
- MSFT\_EPIC\_00000093.
- MSFT\_EPIC\_00000095 – 109.
- MSFT\_EPIC\_00000348.
- NOA-EPIC-APPLE\_000148 – 55.
- PLAYTIKA\_000007.
- ROBLOX-000000582.
- SEA\_00041448.
- SEA\_00041531 – 41.
- VALVE 000389.
- VALVE 001393 – 522.
- VALVE 001523 – 4.
- VALVE\_000677

If not listed, all other documents cited in this report.

## **1. THE APP STORE COMPETES IN THE MARKET FOR DIGITAL GAME TRANSACTIONS**

1. In this section, I demonstrate that the App Store competes in the distinct market for digital game transactions. These are transactions that facilitate the exchange of playable digital game content (including initial downloads, re-downloads, and updates) and in-app purchases of game content between developers and consumers.<sup>1</sup> In the context of the App Store, digital game content is provided by developers that classify themselves as games in the App Store.<sup>2</sup> The market for digital game transactions is a two-sided transaction market. It is therefore necessary to consider substitutability for these transactions on both sides of the platform, meaning for both consumers and developers, when conducting an analysis of the relevant product market.

2. Game developers have a choice of which devices to develop their games for, including developing the same game for different devices as well as similar or different games for different devices. These choices are related to, but distinct from, the choice of where developers offer game transactions. Developers also have choices about how to monetize their games, including by offering free downloads, paid downloads, in-app purchases, subscriptions, purchases outside of the iOS app for content that can be used within the iOS app, and in-app advertising. Similarly, consumers have a choice of which devices to obtain and where to perform game transactions. These choices by developers and consumers affect the terms under which they transact, including prices paid by consumers and commissions charged to developers by transaction platforms.

3. In this section, I present empirical analyses and research that demonstrate that digital game transaction platforms provide services that are strong substitutes, both for the same game and across games, from the perspective of both consumers and developers of games.

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<sup>1</sup> While updates of game apps are a type of digital game transaction and are therefore included in the game transaction market, the data available to me do not include information on app updates. Therefore, my analyses do not include app updates.

<sup>2</sup> As I will discuss for the TV and video streaming app transaction market, app genres in the App Store do not necessarily correspond to relevant markets. See Section 2.1.

***1.1. Game developers have the option to make transactions through many platforms besides the App Store***

4. Game developers that use the App Store for digital game transactions can choose to do so through many different platforms on many types of devices. In Figure 1, I list some examples of current digital game transaction platforms. Each of these platforms serve the exact function as the App Store in that they connect developers to consumers in order to conduct transactions for many different digital games.

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**FIGURE 1**  
***Examples of transaction platforms that provide digital game transactions***

<b>Platform</b>	<b>Compatible devices</b>
1. Amazon Appstore	Android, Fire OS, Blackberry
2. App Store	iOS devices
3. Epic Games Store	PC, Mac
4. GOG.com	PC, Mac, Linux
5. Google Play	Android, Chrome OS
6. Google Stadia	Android, Chromecast Ultra, PC, Mac, iOS devices (via Safari browser)
7. itch.io	PC, Mac, Linux, Android
8. Mac App Store	Mac
9. Microsoft Store	PC, Xbox One, Xbox Series
10. Nintendo eShop	Switch, Nintendo 3DS, Wii U
11. Origin	PC, Mac
12. PlayStation Store	PS4, PS5
13. Samsung Galaxy Store	Samsung Android
14. Steam	PC, Mac, SteamOS + Linux

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Note: See my exhibit backup for full list of sources.

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***1.2. Many game developers choose to use multiple transaction platforms to make game transactions with consumers, often even for the same game***

5. Among the many game transaction platforms, developers often offer the same game on different platforms.<sup>3</sup>

6. In fact, many developers make game transactions for the same game across several game transaction platforms simultaneously. For example, I find that a large share of the developers with the most popular iOS iPhone games also use Google Play to make game transactions for the same game. Similarly, a large share of developers with the most popular Android phone games also use the App Store to make game transactions for the same game. Figure 2 shows that at the end of 2019, among the top 100 downloaded iPhone game apps identified by analytics company App Annie, 83.0 percent were available on both the App Store and Google Play.<sup>4</sup> Among the top 100 downloaded Android phone game apps, 95.0 percent were available through both platforms. For the top 100 game apps by estimated revenue from paid downloads and in-app purchases, the corresponding figures are 99.0 percent and 100.0 percent, respectively. While this analysis only captures two specific game transaction platforms, it nevertheless shows that digital transaction platforms like Google Play provide an alternative to the App Store for developers to make game transactions.

**FIGURE 2**  
***Game apps available across the App Store and Google Play (December 31, 2019)***

Game apps <sup>[2]</sup>	Top downloaded apps <sup>[1]</sup>		Top grossing apps <sup>[1]</sup>	
	Share of top iOS iPhone apps also on Google Play <sup>[3]</sup>	Share of top Android phone apps also on iOS <sup>[3]</sup>	Share of top iOS iPhone apps also on Google Play <sup>[3]</sup>	Share of top Android phone apps also on iOS <sup>[3]</sup>
1. Top 100	83.0%	95.0%	99.0%	100.0%
2. Top 500	79.8%	79.8%	94.4%	94.0%
3. Top 1,000	70.1%	70.4%	85.8%	86.3%

Source: App Annie Store Product Level data; App Annie Product ID data; App Annie Category ID data; App Annie Unified Category ID data  
Note:

<sup>3</sup> There are exceptions to developers' ability to transact on other platforms. For example, some consoles and some PC game transaction platforms (e.g. Epic Games Store) have negotiated exclusivity arrangements limiting distribution on other platforms. See, "Frequently Asked Questions", Epic Games Store, accessed 8/6/2021 at <https://www.epicgames.com/site/es-ES/epic-games-store-faq#:~:text=Why%20does%20the%20Epic%20Games,games%20exclusively%20on%20the%20store.>

<sup>4</sup> Due to data limitations, this analysis could only be conducted for apps in Google Play or the App Store on December 31, 2019.

[1] The Store Product Level data is limited to device codes “android-phone” or “ios-phone” in the US. Top apps are identified by the downloads or estimated revenue on December 31, 2019 for each unified product ID.

[2] Only product IDs identified as a game are included. Included product IDs are subsequently aggregated to the unified product ID level to identify top apps.

[3] Top apps available across the App Store and Google Play are determined using the Product ID data, which contains the “unified\_product\_id” variable and specifies one or more corresponding marketplaces. The marketplaces contained in the Product ID data are “apple-store” and “google-play.” Overlap occurs when the unified product ID corresponds to both the “apple-store” and “google-play” marketplaces. “Share of top iOS iPhone apps also on Google Play” are top iPhone apps that exist on Google Play, and “Share of top Android phone apps also on iOS” are top Android phone apps that exist on the App Store.

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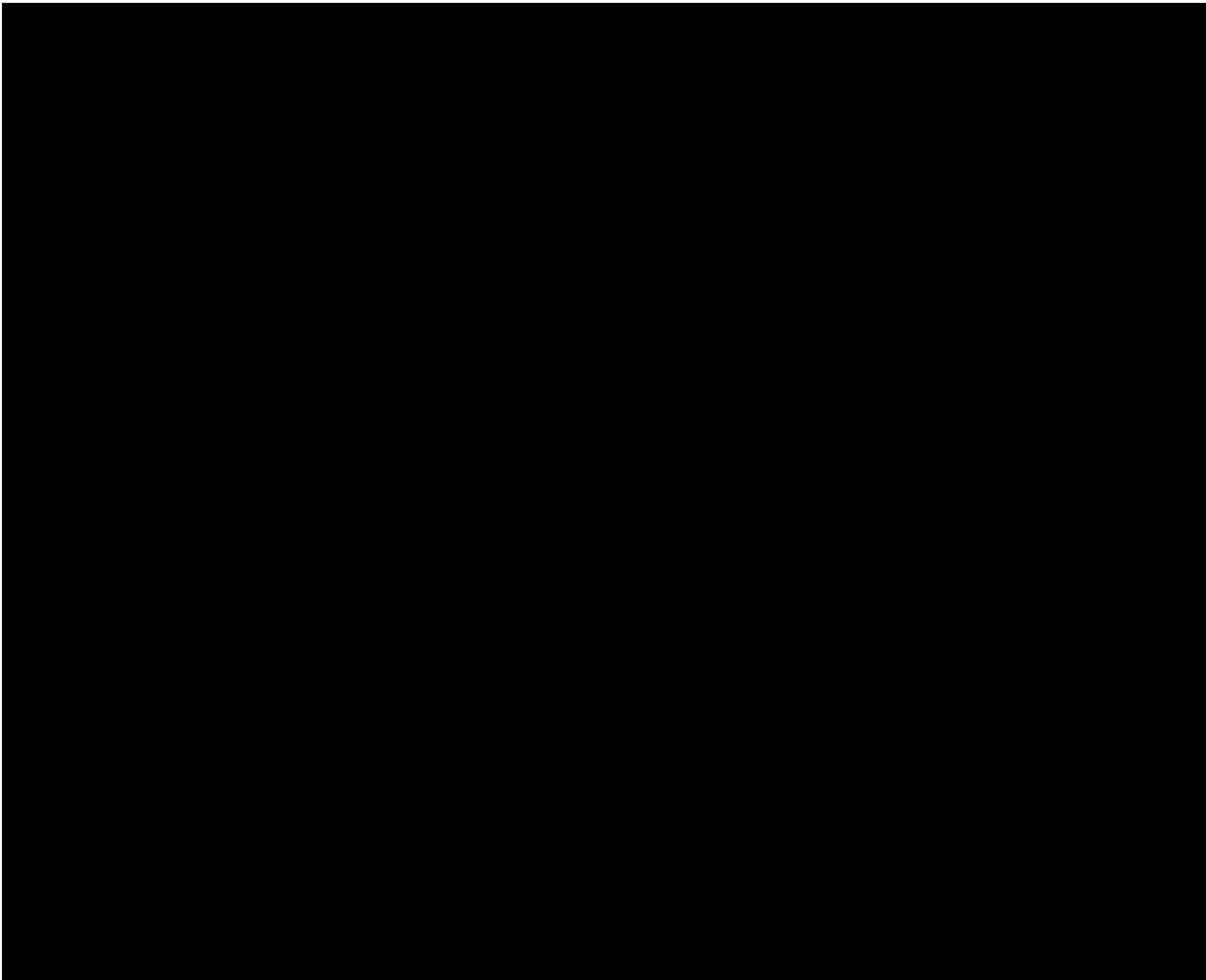
7. A range of successful game developers that currently transact through the App Store have chosen to also make game transactions for the same game available through alternative platforms other than Google Play.

8. Minecraft, one of the best-selling video games of all time, is available through many different transaction platforms including the App Store, Google Play, Microsoft Store, Amazon Appstore, Nintendo eShop, and PlayStation Store, as well as directly from Minecraft’s website.<sup>5</sup> While the initial mobile version of Minecraft had pronounced differences from non-mobile versions, Mojang (the developer of Minecraft) was still able to conduct game transactions on mobile devices. Over time, Mojang invested in a mobile version of Minecraft with added functionality, making it even more comparable to the PC and console versions.<sup>6</sup> Figure 3 shows the percentage of Minecraft game purchases across different devices in 2020. There are a significant number of transactions made across these platforms, including on platforms on PCs, consoles and mobile devices.

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<sup>5</sup> Jordan Sirani, “Top 10 Best-Selling Video Games of All Time,” *IGN*, April 19, 2019, available at <https://www.ign.com/articles/2019/04/19/top-10-best-selling-video-games-of-all-time>, accessed on January 6, 2021; Minecraft, “Where can I buy Minecraft Java Edition?,” available at <https://help.minecraft.net/hc/en-us/articles/360035131351-Where-can-I-buy-Minecraft-Java-Edition>, accessed on February 9, 2020 (“You can buy Minecraft Java Edition from Minecraft.net...If you’d like to play Minecraft: Xbox 360 or Minecraft for Xbox One, you can get them from the Xbox Live Marketplace website, or through your game console... Minecraft: Nintendo Switch Edition is available on the Nintendo eShop on your Switch.”). Microsoft rebranded the online storefront for Xbox One games to “Microsoft Store.” Minecraft for the Xbox 360 is still available through the Xbox 360 Marketplace. See Matt Brown, “Xbox Store rebranding to ‘Microsoft Store’ on Xbox One,” *Windows Central*, September 28, 2017, available at <https://www.windowscentral.com/xbox-store-rebranded-microsoft-store>, accessed on February 12, 2021; and Microsoft, “Minecraft: Xbox 360 Edition,” *Xbox 360 Marketplace*, available at <https://marketplace.xbox.com/en-US/Product/Minecraft-Xbox-360-Edition/66acd000-77fe-1000-9115-d802584111f7>, accessed on February 12, 2021.

<sup>6</sup> For example, certain elements of the game, such as mods (“independent, user-made additions and changes to the [...] game”) and shared servers were only offered on PC/Mac/Linux through the Java Edition and have now expanded to other platforms such as Windows 10 and mobile. See Champions Academy, “Minecraft Mods,” available at <https://www.championsacademyinfo.com.au/minecraft-mods.html>, accessed on January 29, 2021 (“Minecraft mods are independent, user-made additions and changes to the 2011 Mojang video game.”); Minecraft, “Minecraft: How do you want to play?” available at <https://www.minecraft.net/en-us/get-minecraft>, accessed on December 9, 2020; and Mark Hachman, “Minecraft’s PC share shrinks as users stampede to cheaper console and mobile versions,” *PCWorld*, June 2, 2016, available at <https://www.pcworld.com/article/3077990/minecrafts-pc-share-shrinks-as-users-stampede-to-cheaper-console-and-mobile-versions.html>, accessed on December 9, 2020.



9. Roblox, a game with [REDACTED] in May 2020, is available for iOS devices through the App Store as well as the Microsoft Store, the Amazon Appstore, and Google Play.<sup>7</sup> As shown in Figure 4, in the first nine months of 2020, on average [REDACTED]

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<sup>7</sup> ROBLOX-000000582. See also, Dubit, “Dubit Guide to Roblox for Brands,” 2020, available at <https://docsend.com/view/yytafca42a83pbqg>, accessed December 9, 2020. For PC, Roblox is available for download through the Microsoft Store. See Microsoft, “Get Roblox – Microsoft Store,” available at <https://www.microsoft.com/en-us/p/roblox/9nblgggzm6wm>, accessed on February 9, 2021. For both PC and Mac, Roblox is available through a web browser; see Roblox, “How to Install and Play Roblox Using Browser,” available at <https://en.help.roblox.com/hc/en-us/articles/204473560-How-to-Install-and-Play-Roblox-Using-Browser>, accessed on February 9, 2021; For Android devices, Roblox is available on Google Play and the Amazon App Store; see Google Play, “Roblox – Apps on Google Play,” available at <https://play.google.com/store/apps/details?id=com.roblox.client&hl=en>, accessed on February 9,

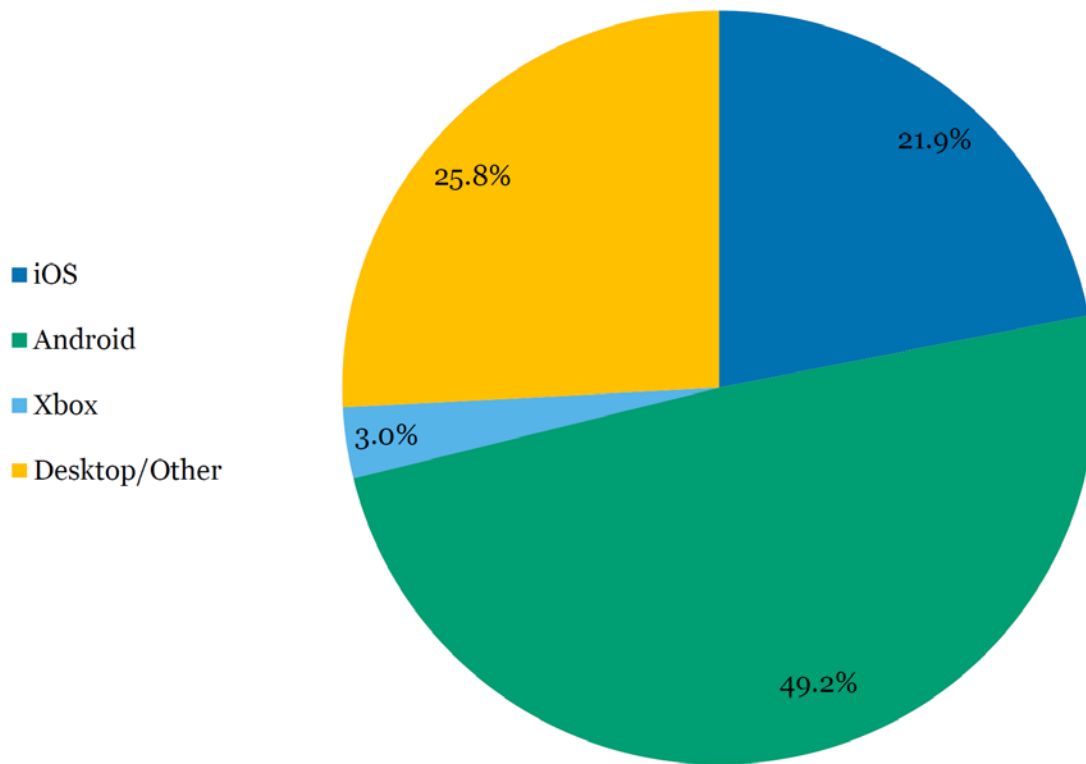
percent of Roblox's monthly active users ("MAU") were on Android devices, 21.9 percent on iOS devices, 3.0 percent on Xbox, and the remaining 25.8 percent on desktops and other devices. In other words, in the first nine months of 2020, non-iOS devices accounted for, on average, 78.1 percent of Roblox's MAU.

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2021; Amazon, "Amazon.com: Roblox: Appstore for Android," available at <https://www.amazon.com/Roblox-Corporation/dp/B00NUF4YOA>, accessed on February 9, 2021. For Xbox One, Roblox is available through the Microsoft Store; see Microsoft, "Get ROBLOX – Microsoft Store," available at <https://www.microsoft.com/en-us/p/roblox/bq1tn1t79v9k>, accessed on February 9, 2021. The HTC Vive and Oculus Rift both have stores for consumers to purchase games, but neither carry Roblox. To play Roblox with either the HTC Vive or Oculus Rift, Roblox needs to be downloaded to a PC that is connected to the Vive/Rift device; see Roblox, "Roblox VR," available at <https://en.help.roblox.com/hc/en-us/articles/208260046-Roblox-VR>, accessed on February 9, 2021; VIVEPORT, "Search results for 'Roblox,'" available at <https://www.viveport.com/catalogsearch/result/?q=roblox>, accessed on February 9, 2021; and Oculus, "Search Rift," available at <https://www.oculus.com/experiences/rift/search>, accessed on February 9, 2021. See also Apple, "App Store Preview: Roblox," available at <https://apps.apple.com/us/app/roblox/id431946152>, accessed on February 13, 2021.

**FIGURE 4**

*Percent of Roblox average Monthly Active Users (MAU) by device (January 2020 – September 2020)*



Source: ROBLOX-000000582

Note: Labels do not sum to 100% due to rounding.

10. Fortnite, from Epic Games, is available on many game transaction platforms, including the Epic Games Store, the Nintendo eShop, Xbox Marketplace on the Microsoft Store, the PlayStation Store, the Samsung Galaxy Store, and GeForce Now (a game streaming platform that consumers can access on a variety of devices including Macs, PCs, Chromebooks,

Android devices, and iOS devices) for transactions on Microsoft's Xbox One, Xbox Series X, and Xbox Series S.<sup>8,9,10</sup>

11. Detailed data, shown in Figure 5, containing monthly playtime and spending for over 350 million Fortnite users from January 2017 to December 2020 show how Epic Games transacts with consumers across many game transaction platforms.<sup>11</sup> Prior to the removal of Fortnite from the App Store, the game had 355 million distinct user accounts, only about one-third of which had accessed the game through iOS.<sup>12</sup> Thus, Epic Games is able to reach the majority of its existing customer base through game transaction platforms other than the App Store and can therefore conduct Fortnite game transactions with the same customer in many different ways.

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<sup>8</sup> Epic Games, "FAQ," November 11, 2020, available at <https://www.epicgames.com/fortnite/en-US/faq>, accessed on January 26, 2021 ("Q. Where can I download Battle Royale? A. You can download Battle Royale in the following places: PC/Mac - Fortnite.com (Apple has terminated our ability to develop Fortnite for Mac. As a result, Fortnite on Mac remains on version 13.40 for Battle Royale/Creative.); PlayStation - PlayStation Store Xbox - Xbox Marketplace; Nintendo Switch - Nintendo eShop Android - Currently available through the Epic Games App on the Samsung Galaxy Store or epicgames.com. Google has blocked your access to Fortnite on Google Play; iOS - Apple has blocked your access to Fortnite on iOS devices."); and Epic Games, "What platforms or devices are compatible with Fortnite?," available at <https://www.epicgames.com/help/en-US/fortnite-c75/technical-support-c118/what-platforms-or-devices-are-compatible-with-fortnite-a6693>, accessed on January 26, 2021.

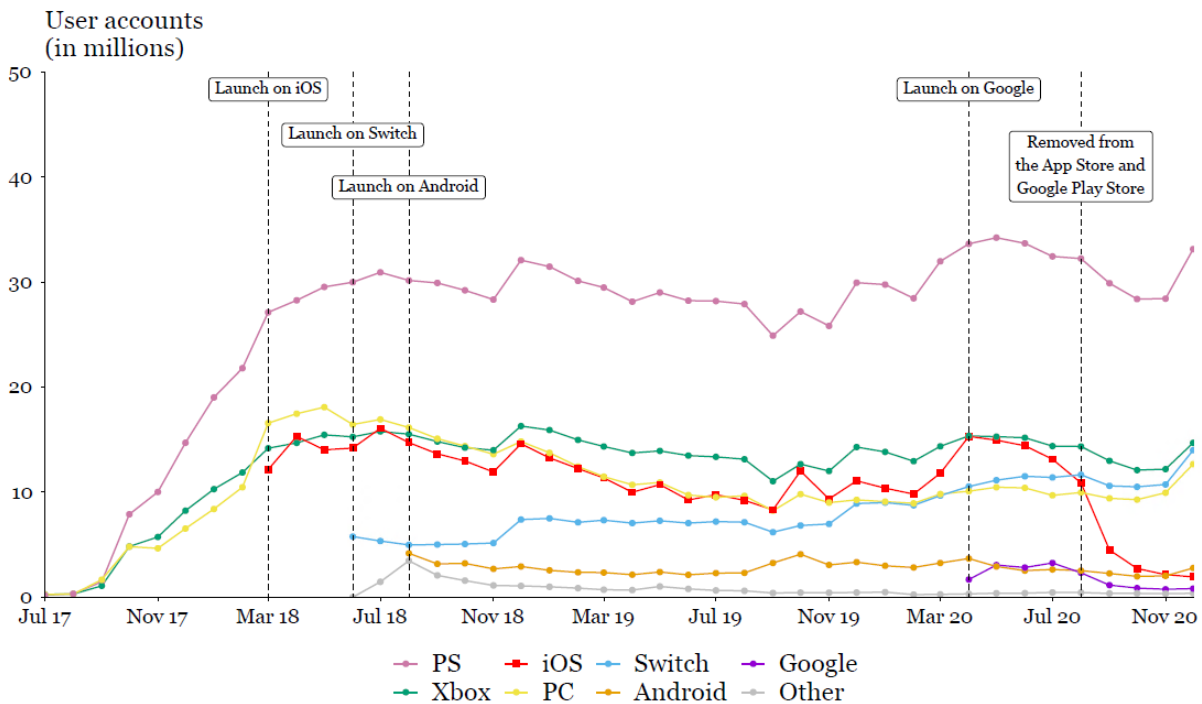
<sup>9</sup> Sean Hollister, "Nvidia's GeForce Now is finally out of beta, challenges Google Stadia at \$5 a month," *The Verge*, February 4, 2020, available at <https://www.theverge.com/2020/2/4/21121996/nvidia-geforce-now-2-0-out-of-beta-rtx>, accessed on September 14, 2020; NVIDIA, "System Requirements," GEFORCE NOW, available at <https://www.nvidia.com/en-us/geforce-now/system-reqs/>, accessed on January 31, 2021.

<sup>10</sup> Previously Epic transacted through the App Store for transactions on iOS devices and Google Play for transactions on Android devices.

<sup>11</sup> The data provided by Epic does not cleanly distinguish between devices and the many game transaction platforms on those devices, instead referring to them all as "platforms." For example, as I discuss in Appendix H, Epic sometimes separates out game transaction platforms (e.g., Google Play) but other times separates out devices that may either be supported by a dedicated transaction platform (e.g., Xbox) or by transaction platforms that are available on several platforms (e.g., Epic separates out PC, on which Epic uses the Epic Games Store as a game transaction platform, which also provides transactions for Mac). Because of this in my exhibits I refer to these as "platforms" as Epic does.

<sup>12</sup> This is the number of distinct accounts which accessed Fortnite until, and including, July 2020. See my workpapers.

**FIGURE 5**  
**Worldwide Fortnite user accounts by platform (July 2017–December 2020)**



Source: Epic Monthly User Data; Fortnite Mobile Presentation, “Mobile Business Update/Deep Dive,” EPIC\_00126800 – 49 at EPIC\_00126802; Nintendo, “Fortnite,” available at <https://www.nintendo.com/games/detail/fortnite-switch/>, accessed on February 1, 2021; Epic Memo, “Epic Mobile Status Update,” April 30, 2020, EPIC\_00127553 – 55 at EPIC\_00127553; Nick Statt, “Apple just kicked Fortnite off the App Store,” *The Verge*, August 13, 2020, available at <https://www.theverge.com/2020/8/13/21366438/apple-fortnite-ios-app-store-violations-epic-payments>, accessed on February 11, 2021; Dieter Bohn, “Fortnite for Android has also been kicked off the Google Play Store,” *The Verge*, August 13, 2020, available at <https://www.theverge.com/2020/8/13/21368079/fortnite-epic-android-banned-google-play-app-store-rule-violation>, accessed on February 11, 2021.

Note: User accounts may appear on one or more platforms in a given month. Category “PS” comprises the platforms “PS4” and “PS5.” Category “Xbox” comprises the platforms “XBOXONE” and “XSX.” Other platforms includes “HONGKONG,” “MICROSOFT,” and “OTHER.” The share of user accounts by platform in July 2020 is as follows: 43% for PlayStation, 19% for Xbox, 17% for iOS, 15% for Nintendo Switch, 13% for PC, 4% for Google, 3% for Android, and 1% for Other platforms. User accounts are included whenever the Fortnite application is opened on a device through that account. See Appendix H for details regarding Epic data processing.

12. While many game developers offer the same game across multiple game transaction platforms, game developers also substitute across game transaction platforms by choosing to offer certain games on some platforms while offering other games on other platforms.



13. EA, a large developers of digital games, transacts through all major digital game transaction platforms as well as directly to consumers through its own storefront, Origin.<sup>13</sup> It has chosen to transact through certain platforms for some games but other platforms for different games, for example:

- EA has offered multiple versions of the soccer game FIFA on various game transaction platforms over time. Its most recent version, FIFA 21, is available through the PlayStation Store, the Microsoft Store, Steam, Google Stadia, and Origin.<sup>14</sup> EA offers a legacy edition on the Nintendo eShop.<sup>15</sup> It also offers a version called FIFA Soccer on the App Store and Google Play.<sup>16</sup>
- EA offers the game Bejeweled Stars only through the App Store and Google Play.<sup>17</sup> Other versions of Bejeweled have been released over time in other platforms such as Xbox and Nintendo DS.<sup>18</sup>
- EA offers the game Apex Legends on the PlayStation Store, the Microsoft Store, Steam, the Nintendo eShop, and Origin.<sup>19</sup>

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<sup>13</sup> “Where to buy EA PC digital download games,” *EA Help*, November 8, 2021, available at <https://help.ea.com/en-us/help/faq/where-to-buy-ea-games-v2/>.

<sup>14</sup> “FIFA 21 Standard Edition PS4 & PS5,” *PlayStation Store*, accessed on August 10, 2021, available at [https://store.playstation.com/en-us/product/UP0006-PPSA01327\\_00-FIFAFOOTBALL2021/](https://store.playstation.com/en-us/product/UP0006-PPSA01327_00-FIFAFOOTBALL2021/); “FIFA Standard Edition on PC,” *EA Sports*, accessed on August 10, 2021, available at <https://www.ea.com/games/fifa/fifa-21/buy/pc>; “FIFA 21,” *Stadia*, accessed on August 10, 2021, available at <https://stadia.google.com/games/fifa-21/>; “FIFA 21 Standard Edition Xbox One & Xbox Series X|S,” *Microsoft*, accessed on August 10, 2021, available at <https://www.microsoft.com/en-us/p/FIFA21StandardEditionXboxOneXboxSeriesXS/9NN50LXZT18Z?rtc=1>.

<sup>15</sup> “FIFA 21 Nintendo Switch Legacy Edition,” *Nintendo*, accessed on August 10, 2021, available at <https://www.nintendo.com/games/detail/fifa-21-nintendo-switch-legacy-edition-switch>.

<sup>16</sup> “FIFA Soccer,” Google Play, accessed on August 8, 2021, available at [https://play.google.com/store/apps/details?id=com.ea.gp.fifamobile&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.ea.gp.fifamobile&hl=en_US&gl=US); “FIFA Soccer,” App Store Preview, accessed on August 8, 2021, available at <https://apps.apple.com/us/app/fifa-soccer/id1094930513>

<sup>17</sup> “Bejeweled Stars,” Google Play, accessed on August 8, 2021, available at [https://play.google.com/store/apps/details?id=com.ea.gp.bejeweledskies&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.ea.gp.bejeweledskies&hl=en_US&gl=US); “Bejeweled Stars,” App Store Preview, accessed on August 8, 2021, available at <https://apps.apple.com/us/app/bejeweled-stars/id974135847>

<sup>18</sup> “Bejeweled 3,” *Metacritic*, accessed on August 10, 2021, available at <https://www.metacritic.com/game/ds/bejeweled-3>; “Bejeweled Blitz LIVE,” *Microsoft*, accessed on August 10, 2021, available at <https://marketplace.xbox.com/en-US/Product/Bejeweled-Blitz-LIVE/66acd000-77fe-1000-9115-d80258410a57#>.

<sup>19</sup> “Select your platform,” APEX, accessed on August 8, 2021, available at <https://www.ea.com/games/apex-legends/play-now-for-free>. EA intends to release a version for iOS and Android devices later in 2021. See “Apex Legends Mobile Regional Betas Start Soon,” APEX, accessed on August 8, 2021, available at <https://www.ea.com/games/apex-legends/news/apex-legends-mobile-regional-betas>.

14. Smaller developers have also chosen to release games in different platforms over time. For example, a small developer called “thatgamecompany” has transacted different games on different platforms:

- It offered the games Flow, Flower, and Journey exclusively on PlayStation 3, including through the PlayStation Store, between 2006 and 2012 through a publishing agreement with Sony. It now offers these games on PC app transaction platforms and app transaction platforms for mobile devices.<sup>20</sup>
- It originally offered the game “Sky: Children of the Light” through the App Store and Google Play in 2019. It started offering the game through the Nintendo eShop for the Nintendo Switch in 2021.<sup>21</sup> The company plans on offering the games on other transaction platforms for more devices soon.<sup>22</sup>

15. These examples thus all show that game developers have many choices of where and how to conduct game transactions with consumers and that they actively choose between these game transaction platforms.

***1.3. Developers treat the App Store and other game transaction platforms as substitutes for making game transactions***

16. Developers substitute across game transaction platforms in part by making decisions about whether, when, and how much to invest in a given game for a particular transaction platform.

17. Evidence shows that developers consider the relative benefits of different game transaction platforms and evaluate game transaction platforms along multiple dimensions

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<sup>20</sup> “Welcome to thatgamecompany,” Thatgamecompany, accessed on August 8, 2021, available at [thatgamecompany.com/#](https://thatgamecompany.com/#); “Flower,” App Store Preview, accessed on August 8, 2021, available at <https://apps.apple.com/us/app/flower/id1279174518>.

<sup>21</sup> Thomas Whitehead, “Sky: Children of The Light is Now Available For Free On Switch eShop,” *Nintendo Life*, June 29, 2021, available at [https://www.nintendolife.com/news/2021/06/sky\\_children\\_of\\_the\\_light\\_is\\_now\\_available\\_for\\_free\\_on\\_switch\\_eshop](https://www.nintendolife.com/news/2021/06/sky_children_of_the_light_is_now_available_for_free_on_switch_eshop).

<sup>22</sup> See list of devices at “Sky,” Thatgamecompany, accessed on August 8, 2021, available at <https://thatgamecompany.com/sky/>.

when choosing the platform on which to develop and release their games. Relevant factors include the commission charged by the platform,<sup>23</sup> the technical sophistication of the device(s) on which the platform is available;<sup>24</sup> the available developer tools;<sup>25</sup> the number of consumers on the platform;<sup>26</sup> the amount those consumers are expected to spend on the platform<sup>27</sup>; and other services provided directly by the platform operator to the developer.<sup>28</sup>

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<sup>23</sup> Nick Statt, “Fortnite for Android will ditch Google Play Store for Epic’s website,” *The Verge*, August 3, 2018, available at <https://www.theverge.com/2018/8/3/17645982/epic-games-fortnite-android-version-bypass-google-play-store>, accessed on February 8, 2021 (“Epic Games announced today that it will not distribute its massively popular game *Fortnite* on Android through Google’s Play Store marketplace.... The second reason is financial: Epic does not want to pay Google’s 30 percent cut.”).

<sup>24</sup> Kevin Murnane, “Taking a Realistic View on Porting Games to Nintendo’s Switch,” *Forbes*, March 14, 2018, available at <https://www.forbes.com/sites/kevinmurnane/2018/03/14/taking-a-realistic-view-on-porting-games-to-nintendos-switch/?sh=1d75715340a1>, accessed on February 8, 2021 (“The desire to play a favorite game on the Switch or generate an additional revenue stream with a Switch port should be tempered with a realistic appraisal of the limitations of the Switch’s hardware. The Switch can’t handle games that are built to take advantage of the processing power in the base Xbox One and PS4, let alone the One X and Pro. The gap between what games demand and what the Switch can do is only going to increase as developers continue to push the limits of the current generation consoles and prepare for whatever Sony and Microsoft are working on for the next generation.”).

<sup>25</sup> Meeting Notes on Apple Games, “Games,” February 6, 2019, APL-APPSTORE 10162267–82 at APL-APPSTORE 10162269–70 (“Developer Tools: Our tech: Metal2, Spritekit, SceneKit, ARKit 2, etc. Most devs are opting to develop on Unity, Unreal engine, b/c they want to be cross-platform. Our tech limits them to iOS only. 90%+ Ocelot games use Unity or Unreal engine. Should we create our own engine?”); Google Presentation, “Play Monthly Review,” September 2020, GOOG-APPL-00044919 – 79 at GOOG-APPL-00044972 (“[G]ames: [E]rosion from competition is real: e.g., msft owns developers from github to visual studio/best game dev tools to full stack liveops support (playfab). [I]n some areas (gpu profiling tools) we’re 2 decades behind”).

<sup>26</sup> Both internal documents and public sources show that the number of users is an important metric to developers. See Ellie Powers, “Games sim-ship on Play,” Google, February 4, 2017, GOOG-APPL-00003362 – 412 at GOOG-APPL-00003399 (“Android grew: Larger userbase - more valuable to developers.”); Dave Thier, “Xbox Series X Vs. PlayStation 5: Developers Clearly Favor One Over The Other,” *Forbes*, January 25, 2020, available at <https://www.forbes.com/sites/davidthier/2020/01/25/xbox-series-x-vs-playstation-5-developers-clearly-favor-one-over-the-other/?sh=22204a6c46e0>, accessed on February 10, 2021 (“If a developer is more interested in PlayStation 5 than Series X, it’s because they think they’ll be able to make more money on that platform. In the case of consoles, that’s likely because they think there will be more of them out there.”); Google Presentation, “Game Streaming,” GOOG-APPL-00042476 – 83 at GOOG-APPL-00042482 (“What should we do? [REDACTED]”).

<sup>27</sup> Apple, “App Store Developers Profiling Research,” March 2015, APL-APPSTORE\_09126673 – 774 at APL-APPSTORE\_09126722 – 3 (“59% say user LTV is an influential metric when making marketing decisions... Half say average revenue per user is an influential metric when making marketing decisions”). The usefulness of understanding price sensitivity for developers has been discussed in academic literature, e.g., see Anindya Ghose and Sang Pil Han, “Estimating Demand for Mobile Applications in the New Mobile Economy,” *Management Science*, 2014, 60(6), pp. 1470 – 1488, p. 1470 (“App developers can use information on the price elasticity of different app categories to determine whether to offer an app for free, and if not for free, how much to charge it. Moreover, given that app stores often collect one-off or subscription fees for paid-apps, it can be useful for them to obtain precise estimates of user demand”).

<sup>28</sup> Email chain from Matt Fischer to Jeff Robbin, et al., “Google Gives Android Developers Improved Analytics To Track Users’ Acquisition And Engagement Data – TechCrunch,” October 4, 2013, APL-APPSTORE\_04452013 – 5 at APL-

18. Many technical tools exist to provide developers the maximum set of options in terms of choosing among platforms on which to make game transactions. For example, developers are able to choose from a variety of game developer engines—such as Unity, Unreal Engine, CryEngine, GameMaker Studio, and more—that offer similar capabilities for distributing across platforms.<sup>29</sup> The Unity game engine, for instance, now supports development for 20 platforms, allowing developers to create one software “build” that they can distribute to any of Unity’s supported platforms.<sup>30</sup> These tools, combined with the evidence that developers have created games for multiple platforms, make it clear that developers are not locked in to any given platform. Instead, developers can choose between different transaction platforms based on those platforms’ economic merits.

19. Evidence from specific game app developers further supports the conclusion that developers consider multiple transactions platforms when developing games. For example, Epic first launched Fortnite on Xbox, PlayStation, and PCs.<sup>31</sup> When discussing the launch of Fortnite on mobile platforms, Epic then decided to “focus [its] engineering efforts” on iOS as

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APPSTORE\_04452013 (“Google is enhancing the reporting they give to their developers. This is a very smart move for them....This is a good reminder that Google sees an opening here and is investing more and more resources to win over developers with better data/analytics and superior tools.”); Deposition of Joe Kreiner (Epic), February 5, 2021 (“Kreiner Deposition”), pp. 242–243 (“The services we provide game developers are CDN hosting, player support, marketing of their games, and handling of refunds... We also waive on Unreal Engine Royalties... which are typically 5 percent... We also have a supporter/creator marketing program where currently Epic pays influencers a 5 percent-of-sales fee if they successfully refer a paying customer into our ecosystem to go buy a game or in-app transactions. And then we also do social – you know social media for game launches, video promotions. We’ve done featuring at physical events, such as E3. And we do sponsorships of the... video games awards as well as other events where we feature games that are available on the Epic Games Store.”); Deposition of Tim Sweeney (Epic), February 8, 2021, pp. 195–196 (“Epic has a team to assist with Epic Games Store and Epic online services and giving partners advice on how to utilize the store and services and, in some cases, provide engineering assistance to key developers at critical points to assist with their experience of getting their app into our store and using our services.”).

<sup>29</sup> Perforce, “What You Need For Cross Platform Game Development,” November 19, 2020, available at <https://www.perforce.com/blog/vcs/cross-platform-game-development>, accessed on February 9, 2021 (“Cross-Platform Game Development Software: Game Dev Engines: Unreal Engine & Unity... CryEngine... GameMaker Studio... LibGDX... Godot Engine... Solar 2D”).

<sup>30</sup> Unity, “Industry-leading Multiplatform Support,” *Unity Technologies*, available at <https://unity.com/features/multiplatform>, accessed on February 9, 2021 (“Build once, deploy anywhere. Reach a wider audience and feel confident that your IP is ready for the future, no matter how the industry evolves or where your imagination takes you. Build your content once and deploy across more than 20 platforms to captivate audiences across formats.”). The Unity engine is a “... platform for creating and operating interactive, real-time 3D content, providing the tools to make amazing games and publish them to a wide range of devices.” See Unity, “Unity Platform,” available at <https://unity.com/products/unity-platform>, accessed on February 14, 2021.

<sup>31</sup> See Figure 5.

opposed to launching Fortnite for both iOS and Android devices simultaneously.<sup>32</sup> This demonstrates Epic's willingness to reallocate resources across transaction platforms depending on their relative advantages. Furthermore, Epic expected to receive "extra support" from Apple by launching on the App Store rather than Google Play, which is consistent with Epic's understanding that Apple treats Google Play as a competing transaction platform.<sup>33</sup> Similarly, Epic's strategy to initially forgo offering Fortnite on Google Play, but then later adopting it, shows that Epic considered alternative game transaction platforms for the game.<sup>34</sup>

20. Developers of course do not always choose to offer every game on every platform, or even every game on multiple platforms. But this does not mean that different transaction platforms are not substitutes merely because the developer chose where to invest its efforts across games. Developers may also choose to create different games for different platforms. For example, Epic released Infinity Blade on iOS, Gears of War on Xbox and PC, Gears of War 3 on Xbox, and Fortnite on PlayStation, Xbox, Switch, PC, iOS and Android.<sup>35</sup> Developers can also release different versions of a game for different platforms—for example, the initial release of the Minecraft mobile version had limited features compared to

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<sup>32</sup> Email chain from Tim Sweeney to Mark Rein et. al., "Re: Android - wild idea," February 18, 2018, EPIC\_00091478 - 82 at EPIC\_00091479 - 80.

<sup>33</sup> Epic expecting concessions from Apple due to an exclusive launch on iOS devices is also consistent with Apple treating Android devices as competitors to iOS devices. The latter would imply that consumers would be willing to switch from Android devices to iOS devices, which would similarly suggest that game transactions through the App Store are substitutes to game transactions through other transaction platforms. See Email chain from Tim Sweeney to Mark Rein et al., "Re: Android - wild idea," February 18, 2018, EPIC\_00091478 - 82 at EPIC\_00091479 - 80. (Daniel Vogel: "Side benefits are that going platform exclusive with iOS allows us to focus our engineering efforts there to accelerate initial launch all while being able to negotiate extra support from Apple. Being on iOS first I assume is also going to build up demand for Android version which in turn should help negotiations with carriers/ phone manufacturers etc."; Arjan Brussee: "The benefit of focusing on IOS right now for initial launch is not to be underestimated and very likely a must.")

<sup>34</sup> Emails between Tim Sweeney, the CEO of Epic Games, and Samsung indicate that Epic did not want to partner with Google and decided to instead offer transactions for Fortnite for Android devices through the Samsung Galaxy Store instead of Google Play, even using its competitive leverage to obtain a lower commission rate for Fortnite with Samsung. Email from Thomas Ko to Tim Sweeney, "RE: Note 9+ Fortnite launch," August 9, 2018, EPIC\_00012739.

<sup>35</sup> Nick Slatt, "Epic removes all Infinity Blade games from the App Store," The Verge, December 10, 2018, available at <https://www.theverge.com/2018/12/10/18135256/infinity-blade-ios-app-store-removed-epic>; "Available Now," Gears of War, accessed on August 8, 2021, available at <https://gearsofwar.com/>; David Tach, "Fortnite cross-platform crossplay guide for PC, PS4, Xbox One, Switch, Mac and mobile," Polygon, September 27, 2018, available at <https://www.polygon.com/2018/3/23/17146848/cross-platform-crossplay-ps4-xbox-pc-switch-ios-mobile-enable-friends-compatible-matchmaking>.

non-mobile versions.<sup>36</sup> It is the developer's choice where to offer its games, and hence where to transact with potential customers.

***1.4. Game developers who have decided to make games for iOS devices have multiple options for making paid transactions with iOS users outside of the App Store, even for content consumed on iOS apps***

21. Game developers also have meaningful design choices available to them that impact where and how consumers will pay them for their games, i.e., make game transactions. While the download of an iOS game app must occur through the App Store, game developers need not pay a commission on these transactions if they choose to make the app free to download. Game developers can also offer game downloads on other game transaction platforms for other devices that a consumer owns. Furthermore, iOS, developers can use competing game transactions platforms, as well as websites, for paid transactions with consumers, even for in-game content that is used in an iOS app.

22. For example, developers can enable customers to use the digital products or in-game currency they purchase through these alternative platforms on their iOS devices. Game developers can also link in-game content and game progression across a user's devices through a common user account (or "single sign-on").<sup>37</sup> This single sign-on can be offered by the developer or through a third-party (such as Apple, Google or Facebook) and lets consumers easily shift their play and in-game content across devices.<sup>38</sup>

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<sup>36</sup> Angelica Green, "A Comparison of Minecraft for PC and Pocket Edition," *VentureBeat*, May 2, 2014, available at <https://venturebeat.com/community/2014/05/02/a-comparison-of-minecraft-for-pc-and-pocket-edition/>.

<sup>37</sup> Nick Slatt, "How to tie a PlayStation-linked Fortnite account to your Nintendo Switch," *The Verge*, September 27, 2018, available at <https://www.theverge.com/2018/9/27/17911418/fortnite-sony-ps4-nintendo-switch-link-how-to-account-fix>; "Can I Play Cross Platform," *Blizzard*, accessed on August 8, 2021, available at <https://us.battle.net/support/en/article/70345>.

<sup>38</sup> Facebook for Developers, "Facebook Login Overview," available at <https://developers.facebook.com/docs/facebook-login/overview>, accessed on March 9, 2021 ("Facebook Login is a fast and convenient way for people to create accounts and log into your app across multiple platforms... People who create accounts with Facebook on one platform can quickly and easily log into your app on another. A person is known by the same User ID everywhere so they can pickup your in-app experience where they left off. Facebook Login is available on iOS, Android, and Web, for desktop apps and for devices such as Smart TVs and Internet of Things objects"); Apple, "What is Sign in with Apple?" available at <https://support.apple.com/en-us/HT210318>, accessed on March 9, 2021 ("Sign in with Apple is the fast, easy, and more private way to sign in to third-party apps and websites using the Apple ID that you already have."); Google Account Help,



23. Indeed, many game developers link in-game content and game progression across a user's devices by having a common user account which spans different game transaction platforms.

- King (the developer of Candy Crush Saga and other popular games) offers a “Kingdom” account which enables players to transfer in-game currency (e.g., “gold bars”) and progression within each game across devices.<sup>39</sup> Thus, a consumer who had been playing Candy Crush Saga on an iPhone can transfer currency and progress to an Android device (and vice versa) as well as between other devices the consumer uses.
- Roblox consumers log-in to the game through a Roblox account, which allows them to transfer the game's digital currency, called Robux, across devices. In-game progress is also tied to a user's Roblox account which allows the user to continue playing the game on other devices.<sup>40</sup>
- Epic similarly connects content in Fortnite to a user's Fortnite account. Any digital products acquired in Fortnite (e.g., “skins”) are usable across all devices on which

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“Use Your Google Account to Sign In to Other Apps or Services,” available at <https://support.google.com/accounts/answer/112802>, accessed on March 9, 2021 (“You can use your Google Account to sign in to third-party apps and services.”).

<sup>39</sup> Candy Crush Saga, created by King Games, is free to download on the App Store and offers an in-game currency called “Gold Bars” which can be purchased using real money from the in-game store. Gold Bars can be accessed on any device on which the user plays Candy Crush Saga. King Games, “Candy Crush Saga,” available at <https://www.king.com/game/candycrush>, accessed on February 7, 2021. King Games, “What are Gold Bars used for?” available at <https://community.king.com/en/blog/kb/articles/596-what-are-gold-bars-used-for>, accessed on February 7, 2021. King Games, “Can I move my game progress onto a new device?” available at <https://community.king.com/en/blog/kb/articles/393-can-i-move-my-game-progress-onto-a-new-device>, accessed on February 7, 2021 (“Use either a King profile or Facebook to easily switch between devices and access your game progress and Gold Bars wherever you play. Boosters and extra lives however, are always stored locally on the device you received them on, so they won't move across devices.”).

<sup>40</sup> Declaration of Craig Donato in Support of Non-Party Roblox Corporation's Response to Epic Games Inc. and Apple Inc.'s Subpoenas, January 15, 2021, p. 3 (“Progress that users achieve while using the App can be applied when the user logs in to their account on a different device or interface. Users of the App are able to purchase and spend Robux, the Roblox virtual currency, within the many different experiences available, including purchasing virtual items and avatars. Regardless of where such purchases are made, they are saved to a user's account, and are accessible from whatever devices the user subsequently logs on from.”). Robux, Roblox's virtual currency, is available for purchase on many platforms, including the browser—a platform where Robux cannot be played. See Roblox, “Buy Robux,” available at <https://www.roblox.com/upgrades/robux>, accessed on February 9, 2021; Zackery Cuevas, “Can you play Roblox without downloading it?” *Android Central*, October 15, 2020, available at <https://www.androidcentral.com/can-you-play-roblox-without-downloading>, accessed on February 9, 2021 (“As of this writing, there's no way to play Roblox within your browser window.”).



that user plays Fortnite.<sup>41</sup> In addition, a user's Fortnite "wallet" of V-bucks can be used across different devices, subject to constraints by some game transaction platforms.<sup>42</sup>

24. The result is that developers can enable customers to use digital products or in-game currency purchased on one game transaction platform on devices served by other game transaction platforms, including iOS devices.

25. Ultimately, if a game developer chooses to set up a digital currency and single sign-on, a user on iOS could choose to *never* make a single paid transaction through the App Store and yet still enjoy all the paid features of the game when playing on an iOS device simply by conducting paid game transactions through other platforms on other devices. This is true not only because the user can use content acquired on other devices on their iOS device but also because while playing the game on an iOS device the user can spend the currency purchased on competing game transaction platforms for content to use on iOS. Thus, transactions through alternative game transaction platforms can be functional substitutes for transactions through the App Store.

26. Overall, the evidence clearly demonstrates that developers have the option to conduct digital game transactions across platforms and can substitute between platforms for transacting with consumers, both within and across games on different game transaction platforms, and even for content consumed within iOS apps.

***1.5. Empirical evidence shows that consumers treat game transactions on other transaction platforms as substitutes for game transactions on the App Store***

27. The fact that developers have so many options to offer game transactions to consumers is mirrored by the fact that consumers have many options available to make digital game transactions—this connection is a fundamental feature of two-sided platforms. I now present

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<sup>41</sup> "FAQ," *Fortnite Epic Games*, accessed on August 8, 2021, available at <https://www.epicgames.com/fortnite/en-US/faq>.

<sup>42</sup> V-bucks purchased on Nintendo Switch or PS4 can only be used on the original platform, but any purchases on these platforms are available to use across all platforms. See Epic Games, "FAQ," August 17, 2020, available at <https://www.epicgames.com/fortnite/en-US/faq>, accessed on February 9, 2021 ("V-Bucks purchased on Nintendo Switch and PlayStation 4 can only be spent on the platform they were purchased on. All other V-Bucks purchases are available across platforms, and all purchased items can be accessed across platforms you play Fortnite on.").

a number of analyses in order to demonstrate that consumers can, and do, substitute across game transaction platforms.

- First, I assess the degree to which consumers use, own, or have access to multiple devices on which game developers offer games. This establishes that consumers multi-home across relevant devices for game transactions and have the ability to switch among devices.
- Second, I assess the degree to which consumers play games across multiple devices. This establishes additional support for the fact that consumers do indeed multi-home when making game transactions across devices and across games.
- Third, I assess the degree to which consumers could multi-home within the most popular games, for example playing or paying for content for the same game across different devices. I analyzed this in detail through data provided by Epic.
- Finally, I assess real world examples that show how consumers actively substitute across game transaction platforms for making game transactions.

28. These analyses show that consumers can and do substitute digital game transactions across different devices by transacting on the various game transaction platforms available on those devices.

***1.6. Consumers can make transactions across many platforms because they own or regularly use different devices on which game transaction platforms are available***

29. Multiple surveys show that consumers do in fact use, own, or have access to multiple devices on which they can make game transactions. For instance, a 2019 study of all U.S. consumers shows that 81 percent owned a smartphone, almost 75 percent owned a desktop or laptop computer, and approximately 50 percent owned a tablet.<sup>43</sup> These general observations also hold for owners of iOS devices. [REDACTED]

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<sup>43</sup> Pew Research Center, “Mobile Fact Sheet,” June 12, 2019, available at <https://www.pewresearch.org/internet/fact-sheet/mobile/>, accessed on February 5, 2021 (“The share of Americans that own smartphones is now 81%, up from just 35% in Pew Research Center’s first survey of smartphone ownership conducted in 2011. Along with mobile phones, Americans own a range of other information devices. Nearly three-quarters of U.S. adults now own desktop or laptop computers, while roughly half now own tablet computers and roughly half own e-reader devices.”).

[REDACTED]

[REDACTED]

[REDACTED] 44

30. In a survey conducted in *Epic v. Apple*, Professor Dominique Hanssens analyzed non-iOS devices used and available for access by individuals who transact through the App Store.<sup>45</sup>

- Among these consumers, 71 percent regularly use a laptop, 48 percent regularly use a desktop, 41 percent regularly use a gaming console/handheld gaming device, 27 percent regularly use a smartphone with a non-iOS operating system, and 23 percent regularly use a tablet with a non-iOS operating system. Overall, virtually all (81 percent) of App Store users regularly use another device besides their iOS device. (See Figure 6.)
- When looking more broadly at both devices regularly used and devices that one could access to use, Professor Hanssens found that 86 percent of App Store users regularly use or had available a laptop, 64 percent regularly use a desktop, 61 percent regularly use a console/handheld gaming device, 56 percent regularly use a smartphone with a non-iOS operating system, and 48 percent regularly use a tablet with a non-iOS operating system. Overall, Professor Hanssens found that 95 percent of App Store users regularly used or have available another device besides their iOS device.<sup>46</sup> Therefore, virtually all iOS consumers have access to devices where other game transaction platforms are available.

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[REDACTED]

<sup>45</sup> Rebuttal Expert Report of Dominique Hanssens, Ph.D., March 15, 2021 (“Hanssens *Epic* Rebuttal Report”).

<sup>46</sup> Hanssens *Epic* Rebuttal Report, Appendix J-1.

**FIGURE 6**  
***Other Electronic Devices Used by iOS App Store Users***

Device	Regularly Used This Device in the Last 12 Months	
	Number of Respondents (n=500)	Percentage of Respondents
<b>Smartphones with Non-iOS Operating Systems</b>	<b>136</b>	<b>27%</b>
Android	108	22%
Microsoft	66	13%
<b>Tablets with Non-iOS Operating Systems</b>	<b>116</b>	<b>23%</b>
Android	90	18%
Microsoft	57	11%
<b>Laptops</b>	<b>357</b>	<b>71%</b>
Apple	182	36%
Brands Other Than Apple	252	50%
<b>Desktops</b>	<b>238</b>	<b>48%</b>
Apple	111	22%
Brands Other Than Apple	178	36%
<b>Gaming Consoles and/or Handheld Gaming Devices</b>	<b>206</b>	<b>41%</b>
Nintendo Switch (including Nintendo Switch Lite)	104	21%
PlayStation (PS Series Console)	125	25%
Xbox	106	21%
Nintendo DS Series	52	10%
PlayStation Vita	28	6%
GPD XD Plus	6	1%
<b>Other Electronic Devices</b>	<b>458</b>	<b>92%</b>
<b>Other Electronic Devices (Non-Apple)</b>	<b>405</b>	<b>81%</b>

Source: Hanssens *Epic Rebuttal Report*, Figure 1

31. The fact that owners of iOS devices use, own, or have access to multiple other devices that provide game transactions means that these consumers can make game transactions on them.

***1.7. Consumers can make transactions across many platforms because they play games on the many devices they own***

32. Beyond simply having access to multiple devices, consumers also make game transactions across multiple devices and through different game transaction platforms. Market research on gamers, the population of consumers who participate in game transactions, indicates that these consumers not only have multiple devices, but also play games on multiple devices. For instance, an EEDAR/NPD study from 2018 showed that 59 percent of U.S. gamers play games on more than one device, and 29 percent on more than

two devices.<sup>47</sup> Other similar statistics from the report include that for households that include a gamer, on average five device types are owned, of which three are used for gaming; 56 percent of gamers play on a mobile device and “at least one other platform,” and 27 percent “play on Mobile, PC & Console.”<sup>48</sup>

33. Substitution of game transactions by consumers is not of course limited to the same game across game transaction platforms. Evidence indicates that cross-game substitution is common. For example, Professor Hanssens’ survey found that 94 percent of iOS Fortnite players play games on non-iOS devices.<sup>49</sup> Epic’s own data indicate that 35.9 percent of iOS Fortnite players also play Fortnite on non-iOS devices.<sup>50</sup> The difference in these two statistics indicates that many iOS Fortnite players play other games on non-iOS devices, even if they do not play Fortnite on non-iOS devices.

34. Even a high degree of substitution between devices may of course understate the opportunities for consumers to play or transact on other devices if they chose or were incentivized to do so. In other words, just because consumers do not substitute game transactions across devices now does not mean they would not do so if faced with a price increase on one particular platform.

***1.8. Consumers can and do substitute game transactions through the App Store with transactions through other game transaction platforms***

35. As I previously discussed, many developers offer versions of their games on multiple devices. Because of this, consumers can not only substitute game transactions between platforms for different games but can also substitute game transactions for the same game on different game transaction platforms.

36. The only data available to me that tracked individuals and their play and purchase decisions across game transaction platforms are data from Epic. While these data are limited to just one game (Fortnite), they are instructive because they exhibit both the scope of

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<sup>47</sup> EEDAR: An NPD Group Company, “Gamer Segmentation: 2018 Syndicated Report,” APL-APPSTORE\_10340122 – 220 at APL-APPSTORE\_10340131.

<sup>48</sup> EEDAR: An NPD Group Company, “Gamer Segmentation: 2018 Syndicated Report,” APL-APPSTORE\_10340122 – 220 at APL-APPSTORE\_10340132 – 3.

<sup>49</sup> Hanssens *Epic* Rebuttal Report, Figure 3.

<sup>50</sup> See Figure 9.

substitutes available to developers and the consumer substitution behavior in regard to playing and making paid game transactions.

37. The Epic data show that Epic's customers generally play Fortnite on multiple devices and make transactions through multiple game transaction platforms. For example, about a third of all Fortnite users have an iOS account, as shown in Figure 7. At the same time, the Fortnite data also show that Fortnite users spent the vast majority (95.6 percent) of their time playing Fortnite on non-iOS devices. For time played, iOS ranks fifth overall, trailing Sony PlayStation, Microsoft Xbox, PC, and Nintendo Switch.

**FIGURE 7**

*Worldwide share of Fortnite user accounts and time played across platforms (March 2018 – July 2020)*

"Platform"	User accounts (in millions)		Hours played (in millions)	
	Count	Percent	Hours	Percent
1. PS4	104	30.2%	32,299	51.9%
2. Xbox One	53	15.5%	13,003	20.9%
3. PC	90	26.1%	8,319	13.4%
4. Switch	31	9.0%	5,369	8.6%
5. iOS	115	33.4%	2,752	4.4%
6. Android	31	9.1%	293	0.5%
7. Google	8	2.2%	50	0.1%
8. Other	10	2.9%	108	0.2%
<b>9. Total</b>	<b>344</b>	<b>-</b>	<b>62,193</b>	<b>100.0%</b>

Source: Epic Monthly User Data

Note: User accounts are included whenever the Fortnite application is opened on a device through that account. The sum of share of user accounts by platform exceeds 100% as a given user account may appear across multiple platforms. Other platforms includes "HONGKONG" and "OTHER." See Appendix H for details regarding Epic data processing.

38. Fortnite users also make the vast majority of their paid transactions outside of the App Store. Figure 8 shows the number of users that make purchases and the value of these purchases, respectively, on all platforms where Fortnite was available between March 2018 and July 2020 (i.e., while Fortnite was fully available on iOS). The vast majority of Epic's Fortnite revenue (93 percent) is generated on non-iOS platforms—that is, iOS only generates 7 percent of revenue, representing the fifth largest platform by revenue.

**FIGURE 8***Percent of worldwide Fortnite revenue across platforms (March 2018 – July 2020)*

“Platform”	Accounts with purchase (in millions)		Revenue (in millions)	
	Count	Percent	Revenue	Percent
1. PS4	36	47.4%	\$4,958	46.8%
2. Xbox One	19	25.4%	\$2,918	27.5%
3. PC	12	15.8%	\$1,015	9.6%
4. Switch	9	11.6%	\$891	8.4%
5. iOS	10	13.3%	\$745	7.0%
6. Android	1	1.4%	\$58	0.5%
7. Google	0	0.3%	\$9	0.1%
8. Other	0	0.1%	\$2	0.0%
<b>9. Total</b>	<b>76</b>	<b>-</b>	<b>\$10,596</b>	<b>100.0%</b>

Source: Epic Monthly User Data

Note: User accounts that make a purchase are those for which revenue is greater than zero in the time period considered. The sum of share of user accounts that make a purchase by platform exceeds 100% as a given user account may make purchases across multiple platforms. Other platforms includes “HONGKONG” and “OTHER.” See Appendix H for details regarding Epic data processing.

39. I next assess the extent to which individual Fortnite users on a given transaction platform multi-home by playing Fortnite on other devices. These multi-homing users can easily shift game transactions from one particular game transaction platform, such as the App Store, to another platform, either for the same game or for other games.

40. I find that for each platform on which Fortnite is available, a large number of Fortnite users already play Fortnite on at least one additional device. These users could therefore make game transactions for Fortnite through those different game transaction platforms. Indeed, as evident in Figure 9, between March 2018 and July 2020, 35.9 percent of users that played Fortnite on iOS devices also played Fortnite on another device. This demonstrates that these consumers can easily substitute game transactions through other platforms.



**FIGURE 9**

*Worldwide user accounts that access Fortnite through multiple “platforms” (March 2018–July 2020)*

<b>“Platform”</b>	<b>Total users (in millions)</b>	<b>Percent of users that are multi-“platform” users</b>
1. iOS	115	35.9%
2. PS4	104	32.1%
3. PC	90	42.4%
4. Xbox One	53	33.0%
5. Android	31	53.7%
6. Switch	31	34.7%
7. Hong Kong	10	5.9%
8. Google	8	54.4%
9. Other	0	99.8%

Source: Epic Monthly User Data

Note: User accounts are included whenever the Fortnite application is opened on a device through that account. A user is defined as a multi-platform user if his or her “account\_id” appears within the respective platform and at least one other platform throughout the relevant time period. See Appendix H for details regarding Epic data processing.

41. I can also analyze consumers who play Fortnite on iOS devices to determine whether these users also play and transact on multiple devices and transaction platforms. I find that not only do most Fortnite users spend most of their time and money outside iOS, as I have already shown, but my analysis in Figure 10 shows that even the specific subset of users who accessed Fortnite on iOS spent the vast majority of their time and money with regard to Fortnite on non-iOS devices and through game transaction platforms other than the App Store. This is direct evidence that these iOS users have and use substitutes to the App Store for making game transactions.

**FIGURE 10***Worldwide time played and revenue by user accounts that accessed Fortnite through iOS (March 2018–July 2020)*

“Platform”	Hours played (in millions)		Revenue (in millions)	
	Hours	Percent	Revenue	Percent
1. iOS	2,752	10.2%	\$745	13.2%
2. Other “platforms”	24,219	89.8%	\$4,890	86.8%
<b>3. Total</b>	<b>26,971</b>	<b>100.0%</b>	<b>\$5,635</b>	<b>100.0%</b>

Source: Epic Monthly User Data

Note: “Other platforms” includes “PS4,” “SWITCH,” “XBOXONE,” “PC,” “GOOGLE,” “ANDROID,” “HONGKONG,” and “OTHER.” See Appendix H for details regarding Epic data processing.

42. Data on where Fortnite customers choose to make in-game purchases show that transaction platforms are substitutes for consumers to engage in game transactions. While the majority of Fortnite’s iOS users do not make paid Fortnite transactions on any devices, of those that do, well over half chose to do so on competing transaction platforms rather than the App Store. Epic data show that between January and July 2020:

- 75.9 percent of iOS Fortnite users did not make a purchase at all;
- 15.8 percent of iOS Fortnite users only made a purchase on non-iOS platforms;
- 5.6 percent of iOS Fortnite users only made a purchase on iOS; and,
- 2.8 percent of iOS Fortnite users made a purchase on both iOS and a different platform.<sup>51</sup>

43. That iOS Fortnite users are choosing to make in-game transactions on platforms other than iOS illustrates that other game transaction platforms are economic substitutes to the App Store for game app consumers to make paid game transactions.

***1.9. Evidence shows that developers and consumers substitute across game transaction platforms, even in the absence of a relative price change incentivizing them to do so***

44. Game transactions on the App Store are economic substitutes, rather than economic complements, for game transactions on other game transaction platforms. This is true by the

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<sup>51</sup> See my workpapers.

very nature of game transactions: any digital game transaction made through an alternative transaction platform or a website is a direct, technical substitute for a game transaction made through the App Store.

45. Consumers and developers of course substitute across game transaction platforms when a consumer chooses to play a game app on a non-iOS device. But consumers and developers can also substitute payment for content across transaction platforms, even if a consumer uses the content in an iOS app. This is because consumers can pay for content on one transaction platform and access that content on another transaction platform. In other words, any observed paid transaction on one platform is a technical substitute for a paid transaction on an alternative platform or through a developer's website, even if a consumer is using the content in an iOS app.

46. Real world examples show that game transactions on the App Store are substitutes, rather than complements, for game transactions on other game transaction platforms. Even in the absence of a change in price on the App Store that would incentivize consumers to substitute to other transaction platforms, these examples show that developers and consumers treat transactions on other game transaction platforms as economic substitutes, not complements, for game transactions on the App Store. In particular, I analyze three real world examples which all show that game transactions on other platforms are substitutes for game transactions on the App Store: (1) users who download a console or PC game transaction app, (2) the launch of Fortnite on the Nintendo Switch, and (3) the removal of Fortnite from the App Store after the Hotfix.

*1.9.1. Analysis of users who downloaded a console or PC game transaction platform companion app*

47. First, to assess whether users substitute between game transactions on the App Store and transactions on PCs and consoles, I analyze iOS device users who downloaded a free companion app for console or PC game transaction platforms (e.g., the Nintendo Switch Online companion app, the Xbox companion app, and the Steam Mobile companion app). This analysis (and many of my other analyses) uses Apple transaction data containing all initial downloads (but not updates or re-downloads) and in-app purchases since the launch of the App Store until September 2019, allowing me to calculate total spending on game apps for all iOS device owners.

48. The download of these companion apps serves as a proxy for whether a user owns and plays games on a console or a PC. While I do not have data on which iOS users own a game

console or play PC games, this proxy variable approach will identify individuals who have likely started playing games more frequently on a console or PC. This could be because the user has recently purchased a console or gaming PC or just because the user has decided to start playing games more on an existing console or PC. Either way, if transaction platforms on consoles and PCs are substitutes for the App Store, I would expect to see a decline in spending on games after users download a companion app.<sup>52</sup>

49. My results find exactly that. iOS device users who downloaded a companion app in 2018 had less spending growth on iOS games between 2017 and 2019 compared to “control group” users who did not download a companion app prior to or in FY2019. The difference in growth rates between users who did and did not download such a companion app is [REDACTED] (Figure 11).<sup>53</sup> The decline in relative spending for users who downloaded a companion app could reflect both shifting of transactions from the App Store to a competing platform for the same game the user would have purchased through the App Store or the user’s choice to purchase an entirely different game.<sup>54</sup>

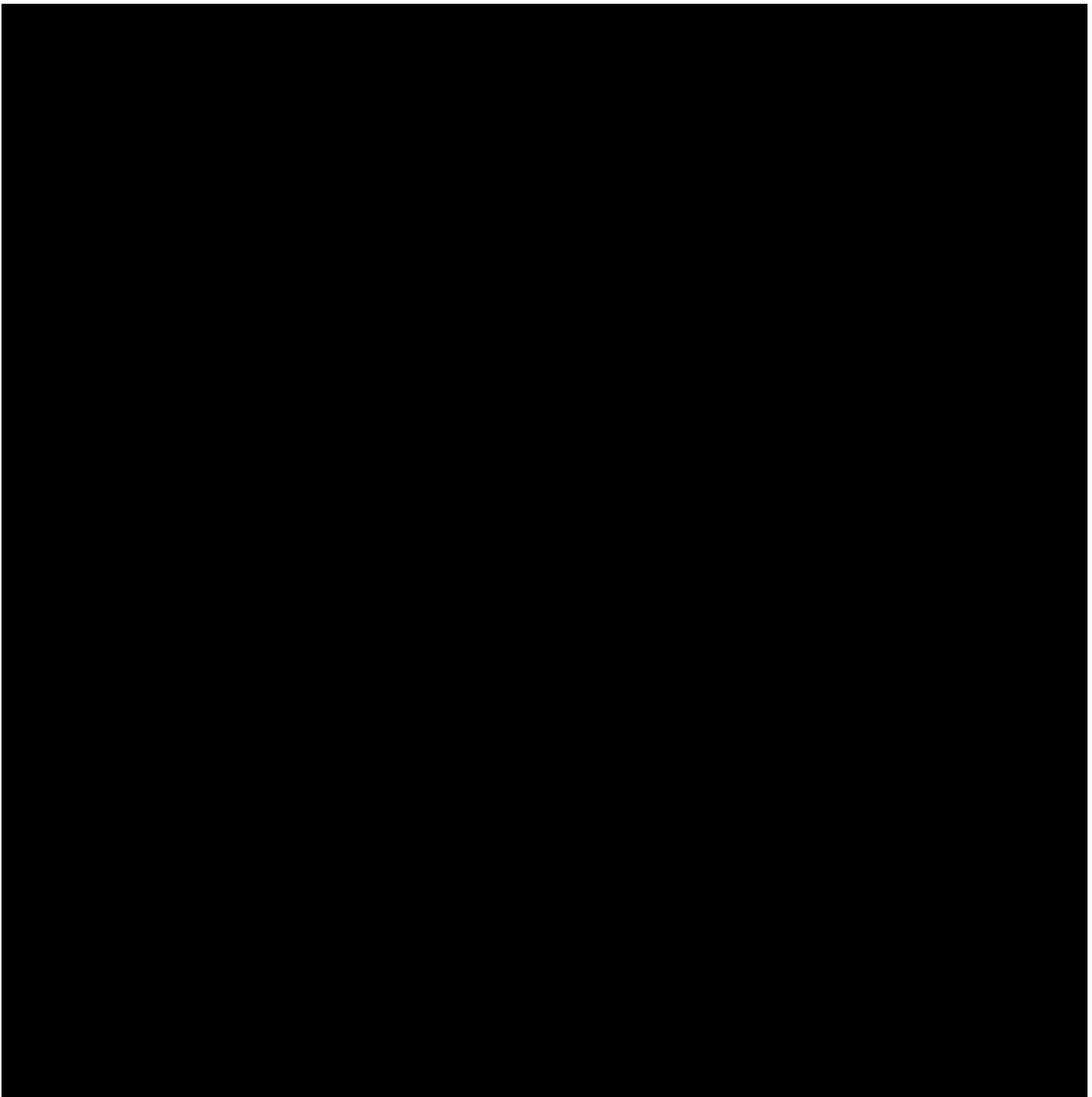
50. Thus, users who downloaded a companion app for console or PC game transaction platforms shifted at least some of their game transactions from the App Store to other transaction platforms, indicating that these other platforms are substitutes for the App Store.

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<sup>52</sup> There may be a concern that the companion app proxy variable is imperfect if, for instance, users who own a console or play games on a PC do not download a companion app. This would only imply that my estimate is conservative. If many users who own a console or play games on a PC do not download a companion app then my analysis would underestimate the decline in spending for users who download a companion app relative to the control group.

<sup>53</sup> I focus on growth in spending rather than absolute levels of spending since different consumers have significantly different overall spending and therefore would be expected to respond to any change in different relative amounts.

<sup>54</sup> In order to assess the robustness of this analysis I also considered two sensitivities. In the first one, I analyze only consumers that had downloaded certain games in 2017 or before, to make sure that the sample was correctly picking up consumers that already played games before. In the second one, I restrict the set of gaming apps to just the Nintendo Switch Online app. Both sensitivities gave qualitatively similar results, showing a relative difference in growth rates of 3.1 and 1.8 percentage points, respectively. See my workpapers.



*1.9.2. The launch of Fortnite on the Nintendo Switch*

51. Another real world example that shows that game transactions on other platforms are substitutes for game transactions on the App Store, even in the absence of a price increase, comes from the launch of Fortnite on the Nintendo Switch.

52. Fortnite launched on the Nintendo Switch in June 2018.<sup>55</sup> To determine if the App Store is a substitute for the Nintendo eShop (the game transaction platform available on the Nintendo Switch), I look at users in the Fortnite data who played Fortnite on both an iOS device and a Nintendo Switch in the first month the game was available on the Nintendo Switch to see if there was a relative decline in iOS playtime and spending on Fortnite. The results of this analysis show that these users shifted their playtime and spending away from iOS following the launch of Fortnite on the Nintendo Switch.

53. To understand this analysis, it is first important to note that spending on Fortnite fell in most months from July 2018 to March 2019 compared to May 2018 (the month prior to the release of Fortnite on the Nintendo Switch). For example, from May 2018 to March 2019, Fortnite spending fell by 18 percent on the App Store and by 33 percent across all platforms.<sup>56</sup>

54. Thus, to account for the decline in overall spending on Fortnite, it is necessary to compare users who played Fortnite on both iOS and the Nintendo Switch in June 2018 to a “control group.” In particular, I compare the playtime and spending on iOS for these users to a “control group” of users who played the game on iOS but not the Nintendo Switch in June 2018. As with the prior analysis, I compare these two groups relative to a baseline level of spending to account for the fact that consumers who play on multiple platforms spend more on Fortnite on average.

55. Figure 12 and Figure 13 show the results of this analysis. Fortnite users who accessed the game on both iOS and the Nintendo Switch in June 2018 played Fortnite on iOS devices less and spent less in the App Store in June 2018 and subsequent months (particularly in the months immediately after June 2018) compared to other iOS users. Prior to the launch of Fortnite on the Nintendo Switch, these two user groups appeared to be growing their time and spending on iOS at approximately the same rates. However, following the launch of Fortnite on the Nintendo Switch, play time and spending for users that started playing Fortnite on the Nintendo Switch immediately diverged from those who did not start playing the game on a Nintendo Switch and these differences persisted for several months. While this

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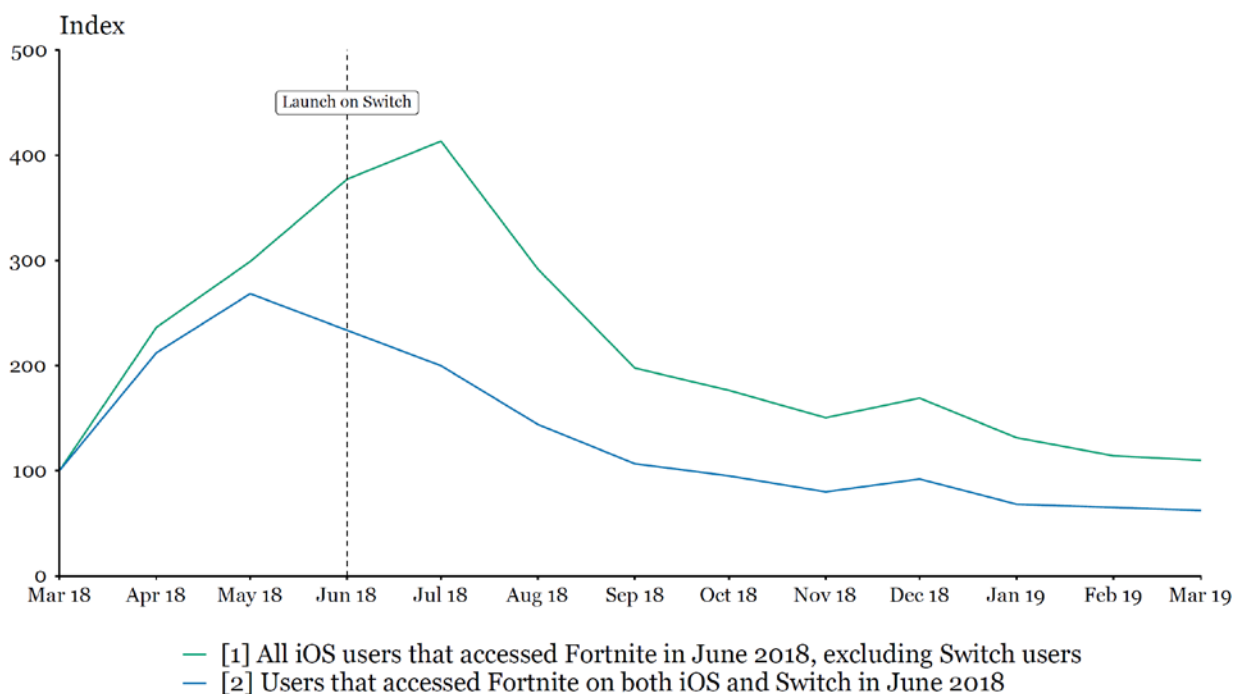
<sup>55</sup> Andrew Webster, “Fortnite has been installed on ‘nearly half’ of all Nintendo Switch systems,” *The Verge*, October 31, 2018, available at <https://www.theverge.com/2018/10/31/18047958/fortnite-nintendo-switch-downloads>, accessed on August 9, 2021 (“That means that around 10 million of those tablets have *Fortnite* installed, a significant jump from the 2 million downloads Epic saw during the game’s first 24 hours of availability after it debuted on the Switch in June.”).

<sup>56</sup> See my workpapers.

analysis cannot capture competition for new users who may have chosen to start playing and spending on the Nintendo Switch rather than on iOS, it nevertheless shows that existing iOS Fortnite users substituted transactions between iOS and the Nintendo Switch after Fortnite became available on the Nintendo Switch.

**FIGURE 12**

*Worldwide Fortnite iOS time played by user accounts that accessed Fortnite on an iOS device in June 2018 (March 2018 – March 2019)*



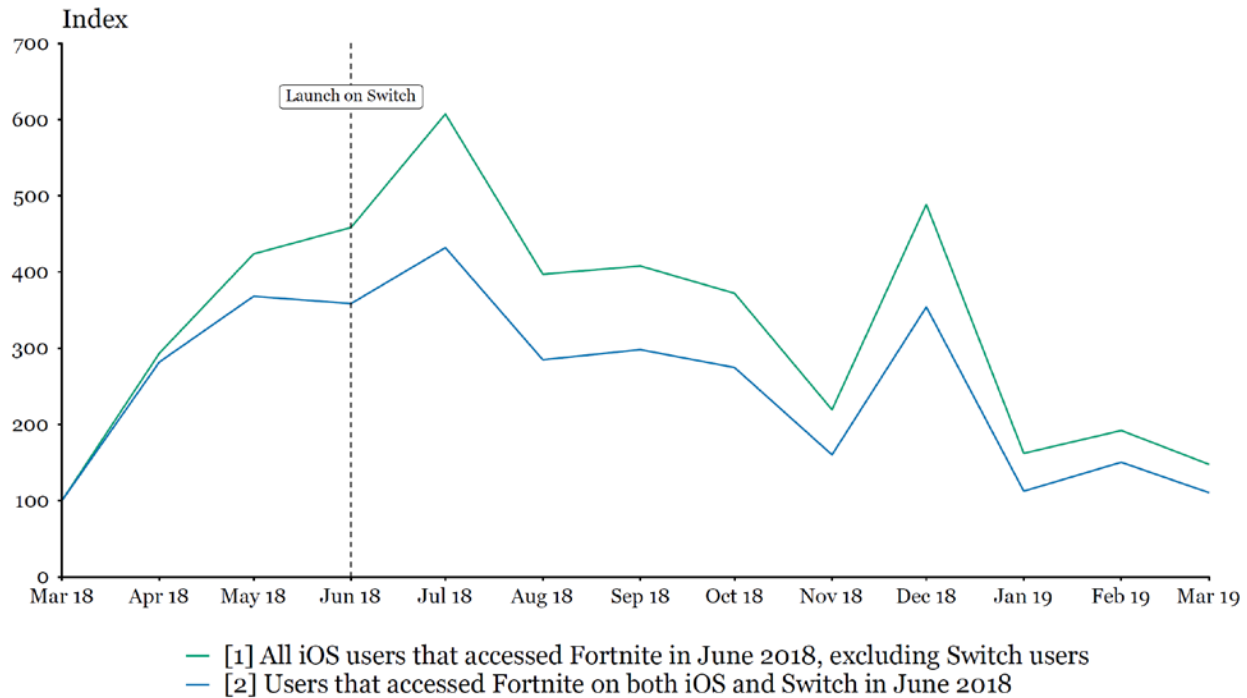
Source: Epic Monthly User Data

Note: Exhibit illustrates monthly time played index (March 2018 = 100) for two groups of users. The first group comprises of 13.2 million users that accessed Fortnite on iOS in June 2018, excluding those users that accessed Fortnite on Nintendo Switch between June 2018 and March 2019. The second group comprises of 457,000 users that accessed Fortnite on both iOS and Nintendo Switch in June 2018, the month Fortnite was launched on Nintendo Switch. User accounts are included whenever the Fortnite application is opened on a device through that account. See Appendix H for details regarding Epic data processing.



**FIGURE 13**

*Worldwide Fortnite iOS revenue from user accounts that accessed Fortnite on an iOS device in June 2018 (March 2018 – March 2019)*



Source: Epic Monthly User Data

Note: Exhibit illustrates monthly revenue index (March 2018 = 100) for two groups of users. The first group comprises of 13.2 million users that accessed Fortnite on iOS in June 2018, excluding those users that accessed Fortnite on Nintendo Switch between June 2018 and March 2019. The second group comprises of 457,000 users that accessed Fortnite on both iOS and Nintendo Switch in June 2018, the month Fortnite was launched on Nintendo Switch. User accounts are included whenever the Fortnite application is opened on a device through that account. See Appendix H for details regarding Epic data processing.

56. Thus, empirical evidence following the introduction of Fortnite on Nintendo Switch, particularly immediately after the event, is consistent with consumers substituting between the two platforms.

### *1.9.3. Analysis of Fortnite and the removal of Fortnite from the App Store after the Hotfix*

57. The game Fortnite exemplifies the substitutability of game transactions across game transaction platforms. As shown in Figure 5, Fortnite users play Fortnite on several devices and make game transactions on different platforms. This is reflected in the Fortnite data, which show that from March 2018 to July 2020, the share of users that accessed Fortnite on a particular platform that also accessed Fortnite on at least one other platform (i.e., multi-

homers) ranged from 32 percent to 54 percent.<sup>57</sup> Between January and July 2020, iOS multi-homers accounted for over 85 percent of Fortnite revenue from iOS device users.<sup>58</sup>

58. V-bucks embody the substitutability of transactions for Fortnite across platforms. With limited exceptions, V-bucks purchases are fungible across devices, and V-bucks purchased on one transaction platform are the same as V-bucks purchased on another transaction platform.<sup>59</sup> A consumer can purchase V-bucks all on one transaction platform, all on another transaction platform, or on both. However, combining together V-bucks purchased on multiple platforms does not result in something different or better (unlike when complementary products, like salt and pepper, are combined) compared to V-bucks purchased on only one transaction platform.

59. I analyze data on all of Epic's Fortnite users following the removal of the iOS Fortnite app from the App Store in August 2020 to see whether iOS Fortnite users switched their spending on Fortnite to non-iOS and non-Google platforms.<sup>60</sup> My analysis shows that Epic retained the vast majority (81.1 percent to 87.7 percent) of iOS Fortnite users' pre-Hotfix

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<sup>57</sup> See Figure 9.

<sup>58</sup> See my workpapers.

<sup>59</sup> Sony and Nintendo impose contractual terms which require V-bucks purchased through their platforms only to be used on their own consoles. Apple does not have any such restrictions. See Epic Games, "FAQ," June 8, 2021, available at <https://www.epicgames.com/fortnite/en-US/faq>, accessed on August 10, 2021 ("V-Bucks purchased on Nintendo Switch and PlayStation 4 can only be spent on the platform they were purchased on. All other V-Bucks purchases are available across platforms, and all purchased items can be accessed across platforms you play Fortnite on.").

<sup>60</sup> Apple removed the iOS Fortnite app from the App Store in response to Epic's decision to implement a "Hotfix" update to its app that allowed customers to bypass Apple's in-app payment functionality and instead directly purchase V-bucks in the app from Epic. The removal of the app prevented new consumers from downloading the app or existing users from downloading updates until Epic updates the app to bring it back into compliance with the App Store rules. Epic Games, "The Fortnite Mega Drop – Permanent Discounts Up To 20%," September 10, 2020, available at <https://www.epicgames.com/fortnite/en-US/news/the-fortnite-mega-drop-permanent-discounts-up-to-20-percent>, accessed on August 10, 2021 ("Today, we're also introducing a new way to pay on iOS and Android: Epic direct payment. When you choose to use Epic direct payments, you save up to 20% as Epic passes along payment processing savings to you."); Sam Byford, "Apple fires back at Epic: 'We won't make an exception,'" *The Verge*, August 17, 2020, available at <https://www.theverge.com/2020/8/17/21373108/apple-response-epic-app-store-fortnite-lawsuit>, accessed on February 8, 2021 ("We very much want to keep the company as part of the Apple Developer Program and their apps on the Store," Apple says in a statement to The Verge. "The problem Epic has created for itself is one that can easily be remedied if they submit an update of their app that reverts it to comply with the guidelines they agreed to and which apply to all developers." ... Apple and Google removed Fortnite from the App Store and the Play Store in response to Epic's violation...").

revenue (across all transaction platforms) in the four months post-Hotfix period (see Figure 14).

60. This retention happened in large part because both iOS single-homers and iOS multi-homers switched a significant amount of their pre-Hotfix spending made through the App Store to other non-iOS, non-Google platforms in the post-Hotfix period. In September 2020, just one month after the Hotfix, the increase in spending on non-iOS, non-Google platforms by July 2020 iOS users was 22.4 percent of what was lost from paid transactions through iOS, controlling for general market and usage trends.<sup>61</sup> By December 2020, the share had increased to 40.9 percent. Similarly, between September 2020 and December 2020, the increase in spending on non-iOS, non-Google platforms by iOS single-homers was between 22.4 and 37.5 percent of what was lost from paid transactions through iOS, and the corresponding shares for iOS multi-homers were 18.7 to 63.2 percent. The results make it clear that iOS users shifted a meaningful portion of their paid game transactions to non-iOS and non-Google platforms after the Hotfix.

#### FIGURE 14

*July 2020 iOS user switching and retention, worldwide (September 2020 – December 2020)*

	Jul/Sep	Jul/Oct	Jul/Nov	Jul/Dec
1. <b>Percent of pre-“hotfix” total revenue retained across all “platforms” (all iOS users)</b> <sup>[1]</sup>	81.1%	84.9%	87.7%	86.2%
<b>Increase in revenue on other “platforms” as a fraction of revenue lost on iOS</b>				
2. All iOS users <sup>[2]</sup>	22.4%	36.5%	51.4%	40.9%
3. iOS single-homers <sup>[3]</sup>	26.5%	37.5%	30.6%	22.4%
4. iOS multi-homers <sup>[4]</sup>	18.7%	35.3%	63.2%	49.4%

Source: Epic Monthly User Data

Note:

[1] All “platforms” excludes Google. The percent of pre-Hotfix revenue retained for all iOS users is calculated as the total iOS user revenue on all platforms in the specified month divided by the expected 2020 retention dollar amount on all platforms in that month, i.e. monthly revenue that would be expected from all iOS users in September – December, if Fortnite was not removed from the App Store in August 2020 after accounting for general market and usage trends. All platforms excludes Google.

[2] iOS users are users who accessed Fortnite in July 2020 on iOS.

[3] iOS single-homers are users who accessed Fortnite only on iOS between March 2018 and July 2020 and accessed Fortnite in July 2020.

<sup>61</sup> Expected Fortnite App Store revenue, given general market and usage trends, could either remain on the App Store through Epic Direct payment, switch to other platforms in the form of additional Fortnite paid transactions, or no longer be collected by Epic (because it is being spent on other games or no longer being spent on games). Paid transactions that are “lost” from iOS are those that are no longer being collected through an iOS device (i.e. either switching to Fortnite paid transactions on other platforms or no longer being collected by Epic).

[4] iOS multi-homers are users who accessed Fortnite on a non-iOS and iOS “platform” between March 2018 and July 2020 and accessed Fortnite in July 2020 on iOS.

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61. In fact, Epic publicly encouraged users to switch transaction platforms following Fortnite’s removal from the App Store. My analyses of the Fortnite data show that effort was successful. Such an effort to switch consumers to alternative transaction platforms could only happen, however, because game transactions on these alternative platforms are substitutes for transactions on the App Store.

\* \* \*

62. Overall, these analyses indicate that game developers and game consumers have choices on where to perform game transactions. Developers and consumers treat these options as substitutes, which indicates that different transaction platforms compete with the App Store for game transactions.

63. Collectively these analyses indicate that there is a well-defined games transaction market and that Apple already faces competition for games transactions with other platforms. This reinforce my prior analyses that indicate that the existing commission rate structure utilized by the App Store represents a competitive commission rate.

## **2. THE APP STORE COMPETES IN THE MARKET FOR TV AND VIDEO STREAMING APP TRANSACTIONS**

64. In this section, I demonstrate that the App Store competes in the distinct market for TV and video streaming app transactions (for simplicity going forward, I refer to these as “video streaming app transactions”). As with the market for digital game transactions, the market for video streaming app transactions is a two-sided transaction market. Thus both consumers and developers (i.e., both sides of the market) define the boundaries of the market, and it is necessary to consider the substitutability of video streaming app transaction platforms from the perspective of both consumers and developers.<sup>62</sup> The firms that provide video streaming app transactions provide services that are strong substitutes from the perspective of both consumers and developers of TV and video streaming apps (“video streaming apps”). That is, both consumers and developers can receive the same or similar content and services from different video streaming app transaction platforms and can shift transactions among these platforms depending on their relative costs and benefits.

65. In this section, I present empirical evidence that shows that developers and their customers can and do make video streaming app transactions through video streaming app transaction platforms other than the App Store and on non-iOS devices. I further show that the video streaming app transactions provided by these other transaction platforms are substitutes for video streaming app transactions provided by the App Store. Consumers and developers can receive all the benefits of transacting through the App Store for streaming applications while incurring no commission to the App Store; some developers take advantage of this option, while others monetize entirely within the App Store, and some perform a mix of both.

### ***2.1. Available evidence shows that video streaming apps compete with each other***

66. I first consider the developers that offer video streaming apps and participate in video streaming app transactions through the App Store. While video streaming apps are typically listed under the Entertainment app genre in the App Store, not all Entertainment apps are video streaming apps. Hence the set of developers and customers participating in the video streaming app transaction market is not necessarily the same as the set of developers and customers that transact through apps within the Entertainment genre more broadly. This

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<sup>62</sup> Schmalensee Report, Section VII.D.

makes the video streaming app transaction market different from the game transaction market in that all apps in the Games genre on the App Store are game apps, but there are apps in the Entertainment genre on the App Store that are not video streaming apps, such as Ticketmaster and Eventbrite, which are services for purchasing tickets for live musical, theatrical, or sporting events.<sup>63</sup>

67. Figure 15 lists the top 20 apps in the Entertainment category in the App Store by number of downloads and revenue in 2020. Some of these apps are video streaming apps, like Amazon Prime Video, and some are not, like Xbox. I focus on video streaming apps, as they have a variety of common features, including and importantly the scope of competitive options for making video streaming app transactions.

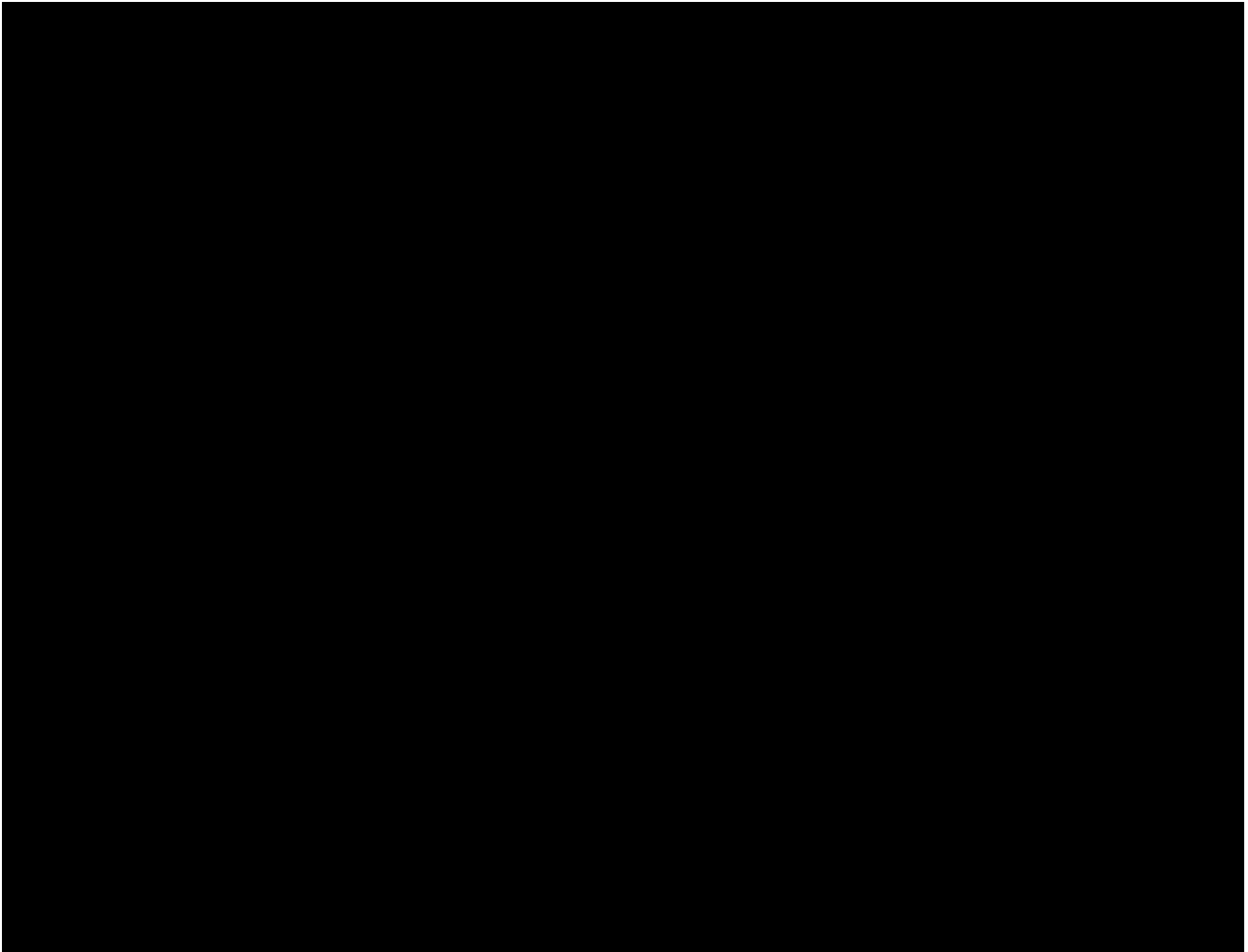
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<sup>63</sup> While I have not attempted to identify all video streaming apps that transact through the App Store, it is also possible that developers could choose to list their video streaming apps in app genres other than Entertainment.

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**FIGURE 15**

*Top 20 apps by revenue and downloads on App Store within entertainment genre (January 1, 2020 – December 31, 2020)*



68. [REDACTED] of the top 20 apps by downloads or revenue in the Entertainment genre are video streaming apps, as they currently provide on demand video streaming of TV shows or films for a general audience. These apps include [REDACTED]

[REDACTED] While there are additional video streaming apps that transact through the App Store and would be participants in a video streaming app transaction market, the identification of these additional market participants would require



additional individual inquiry into what type of app the developer has offered.<sup>64</sup> Here I analyze the largest video streaming apps to show the scope of competitive options available to developers and consumers for making video streaming app transactions (and how Apple competes within this environment).<sup>65</sup> In addition, while video streaming app developers could choose not to have an iOS app and instead transact with consumers outside of the App Store (e.g., through another video streaming app transaction platform or through a website on an iOS device), in practice all major video streaming app developers have chosen to offer iOS apps.<sup>66</sup>

69. The video streaming app transactions market is a well-defined market, and developers of video streaming apps compete with other developers of video streaming apps. For example, the Digital Entertainment Group estimated that the industry generated revenue of \$26.5 billion on digital entertainment purchases, rentals, and subscriptions within the U.S. in 2020.<sup>67</sup> The 14 distinct apps in bold that I highlight in Figure 15 collectively generated [REDACTED] in total billings from app downloads and in-app purchases through the App Store's U.S. storefront in calendar year 2020.<sup>68</sup> These apps had free and/or paid transactions with [REDACTED] consumer accounts, of which [REDACTED] consumer accounts spent money on these apps through the App Store's U.S. storefront in calendar year 2020.<sup>69</sup>

70. Developers of video streaming apps face competition from other developers of video streaming apps, particularly in more recent years as newer video streaming services have

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<sup>64</sup> In particular, some of the apps in Figure 15 only offer specific types of streaming content, such as cartoons, children's programming, or foreign-language programming. While I do not analyze these apps here, further individualized analysis would be required to determine if such video streaming apps compete with video streaming apps that provide general content.

<sup>65</sup> For example, other TV and video streaming apps on the App Store with fewer downloads or less revenue in 2020 include Hallmark Movies Now, Shudder: Horror & Thrillers, Epix Now: Watch TV and Movies, The Criterion Channel, and Watch TNT. I exclude the app Quibi, which ceased operations in December 2020. *See*, "Quibi officially announces it's shutting down," CNBC, October 21, 2021, available at <https://www.cnbc.com/2020/10/21/quibi-to-shut-down-after-just-6-months.html>.

<sup>66</sup> For example, the top video streaming services according to U.S. News all have iOS apps that are listed in Figure 15 (with the exception of Apple TV+, which I do not analyze). *See* Sarah Shelton et al., "Best Streaming Services of 2021," *U.S. News*, June 17, 2021, available at <https://www.usnews.com/360-reviews/streaming-services>.

<sup>67</sup> "DEG Year-End 2020 Digital Media Entertainment Report," *The Digital Entertainment Group*, January 26, 2021, available at [https://www.degonline.org/portfolio\\_page/deg-ye-2020-home-entertainment-report/](https://www.degonline.org/portfolio_page/deg-ye-2020-home-entertainment-report/).

<sup>68</sup> *See* my workpaper.

<sup>69</sup> *See* my workpaper.

launched.<sup>70</sup> For example, many of the video streaming apps analyzed in Figure 15 mention other video streaming apps as their competitors or peers in their annual 10-K report.

- Disney owns the Disney+ and Hulu apps. It measures its performance from October 2015 to October 2020 against various comparison groups, including its “Media Industry Peers” which consists of Alphabet (owner of YouTube TV), Amazon, AT&T (owner of HBO Max), CBS and Viacom (since their merger, jointly owners of BET+, Paramount+, Pluto TV, and SHOWTIME), Comcast (owner of Peacock), and Netflix, among others.<sup>71</sup>
- Alphabet (owner of YouTube TV) acknowledges competition from “[p]roviders of digital video services such as Amazon, Apple, AT&T, Disney, Facebook, Hulu, Netflix and TikTok.”<sup>72</sup>
- Comcast (owner of Peacock) states that it competes with a number of different digital video streaming providers in the U.S., including Amazon Prime Video, Disney+, HBO Max, Hulu and Netflix.<sup>73</sup>
- ViacomCBS (owner of BET+, Paramount+, Pluto TV, and SHOWTIME) describes Amazon, Apple, Hulu, Netflix, and YouTube as its competitors.<sup>74</sup> A “Peer Group” index ViacomCBS uses to benchmark its performance includes The Walt Disney Company and Fox Corporation (owner of Tubi).<sup>75</sup>

As I discuss next, this competition takes place across multiple video app transaction platforms that are part of the market for video streaming app transactions. In addition,

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<sup>70</sup> See, e.g. R. T. Watson, “Netflix, Disney and Amazon’s Streaming Wars Heat Up Overseas,” *The Wall Street Journal*, April 22, 2021, available at <https://www.wsj.com/articles/netflix-disney-and-amazons-streaming-wars-heat-up-overseas-11619083801>; Julia Alexander, “Netflix won’t shy away from taking bold swings’ as streaming competition heats up,” *The Verge*, October 16, 2019, available at <https://www.theverge.com/2019/10/16/20917387/netflix-streaming-wars-earnings-subscribers-q3-disney-apple-stranger-things>; Alex Sherman, “How to tell who’s winning — and who’s losing — the streaming wars,” *CNBC*, February 18, 2021, available at <https://www.cnbc.com/2021/02/18/streaming-wars-how-to-tell-whos-winning-and-whos-losing.html>.

<sup>71</sup> The Walt Disney Company, SEC Form 10-K for period ended October 3, 2020, filed on November 25, 2020, p. 134 (“The Media Industry Peers is a custom index consisting of, in addition to The Walt Disney Company, media enterprises Alphabet, Amazon, Apple, AT&T, CBS, Comcast, Discovery, Facebook, Netflix and Viacom... CBS and Viacom merged in December 2019 to become ViacomCBS, and the combined company remained in both peer groups.”).

<sup>72</sup> Alphabet Inc., SEC Form 10-K for period ended December 31, 2020, filed on February 2, 2021, p. 7.

<sup>73</sup> Comcast Corporation, SEC Form 10-K for period ended December 31, 2020, filed on February 3, 2021, p. 11.

<sup>74</sup> Comcast Corporation, SEC Form 10-K for period ended December 31, 2020, filed on February 3, 2021, p. I-27 (“[I]ncreased competition in the market for development and production of original programming, such as from Amazon, Apple, Facebook, Hulu, Netflix and YouTube, and streaming services by large entertainment companies, increases our content costs as they introduce different ways of compensating talent and approaching production.”).

<sup>75</sup> Comcast Corporation, SEC Form 10-K for period ended December 31, 2020, filed on February 3, 2021, p. II-2.

websites for video streaming apps offer an additional competitive option and constraint for video streaming app transaction platforms.

***2.2. Developers and consumers engage in video streaming app download transactions on multiple transaction platforms***

71. Evidence shows that video streaming app developers and consumers successfully use a variety of alternative transaction platforms to conduct video streaming app download transactions, thus allowing consumers to download and use video streaming apps on many types of devices. Developers that offer video streaming apps through the App Store can and do choose to also offer the same apps through many different platforms on many types of devices. In fact, many video streaming app developers make download transactions across several app transaction platforms simultaneously.

72. Figure 16 shows that all of the top video streaming apps I listed in Figure 15 are available for download on alternative app transaction platforms in addition to the App Store. For instance, in addition to the App Store, consumers are able to download the Netflix app through other app transaction platforms for mobile devices, such as the Google Play Store and the Amazon Appstore. Netflix is also available through app transaction platforms for digital media players such as Roku TV and Fire TV, console platforms such as the Microsoft Store for Xbox and the PlayStation Store, and PC platforms such as the Microsoft Store for PC. In particular, 100 percent of the major video streaming apps can be downloaded on app transaction platforms other than the App Store.

**FIGURE 16***Availability of video streaming apps on websites and supported platforms*

Developer	Websites	Mobile Devices				TV			Consoles			Computers		
		App Store	Google Play	Sam-sung Galaxy Store	Ama-zon App-store <sup>[1]</sup>	Smart TVs	Roku Device	Fire TV	Micro-soft Store for Xbox	Play Station Store	Ninte-ndo eShop	Micro-soft Store for PC	Mac Store	Epic Games Store Steam
1. Amazon Prime Video	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
2. BET+	✓	✓	✓		✓	✓	✓	✓						
3. Disney+	✓	✓	✓		✓	✓	✓	✓	✓	✓				
4. HBO Max	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	
5. Hulu	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		
6. Netflix	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓		
7. Paramount+	✓	✓	✓		✓	✓	✓	✓	✓	✓				
8. Peacock TV	✓	✓	✓		✓	✓	✓	✓	✓	✓				
9. Philo	✓	✓	✓		✓	✓	✓	✓						
10. Pluto TV	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	
11. SHOWTIME	✓	✓	✓		✓	✓	✓	✓	✓	✓				
12. STARZ	✓	✓	✓		✓	✓	✓	✓	✓					
13. Tubi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
14. YouTube TV	✓	✓	✓		✓	✓		✓	✓	✓				

Source: See my exhibit backup for full list of sources.

Note:

[1] Amazon Appstore for mobile devices, including apps for Fire OS and Android.

73. The devices on which consumers can download video streaming apps include smartphones, tablets, personal computers, some game consoles, media player devices (e.g. Roku), and smart TVs. While some of the devices and platforms that support transactions for video streaming apps overlap with some of the devices and platforms that support transactions for game apps (notably, mobile devices and some consoles), there are certain devices and platforms that only support video streaming app transactions and other devices and platforms that typically only support downloads of game apps. For example, video streaming apps are not typically available on platforms that focus on game transactions, such as the Epic Games Store and Steam.<sup>76</sup> On the other hand, some of the devices and platforms for video streaming app transactions, such as Smart TVs and media players, do not typically provide game app transactions. Thus, the set of available substitutes for performing video streaming app download transactions are not currently the same as the set of available substitutes for performing game app download transactions.

74. Additionally, developers can offer video streaming directly through a website. For example, customers can stream Netflix's content directly on the Netflix website through any

<sup>76</sup> Hitt Report, ¶¶ 91, 100.

web browser. In fact, 100 percent of the major video streaming apps listed in Figure 16 can be streamed through the developers' websites.

75. Given that consumers typically own multiple devices that support video streaming app transactions, app developers have the ability to transact with the same customer in many different ways. Several sources demonstrate that consumers have access to multiple transaction platforms (or web browsers) through which they can download and use video streaming apps on multiple devices. For example, studies on all U.S. adult consumers show that 85 percent own a smartphone, 77 percent own a desktop or laptop computer, and 53 percent own a tablet as of January 2021, all of which support download transactions for video streaming apps (as shown in Figure 17).<sup>77</sup>

76. These general observations also hold for owners of iOS devices. For instance, an Apple survey of iPhone owners conducted in July 2020 found that [REDACTED] owned a Mac notebook or desktop, [REDACTED] owned a Windows PC laptop or desktop, [REDACTED] owned a Smart TV and [REDACTED] owned a gaming console (such as a PlayStation or Xbox). In addition, [REDACTED] owned a non-iPad tablet (such as a Samsung or Amazon Fire tablet).<sup>78</sup> Another Apple survey from late June 2020 to late September 2020 found that [REDACTED] of recent iPhone buyers owned a Mac notebook or desktop, [REDACTED] owned a Windows PC laptop, Windows desktop, or Chromebook, [REDACTED] owned a Smart TV, [REDACTED] owned a gaming console, and [REDACTED] owned a non-iPad tablet.<sup>79</sup>

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<sup>77</sup> "Mobile Fact Sheet," *Pew Research Center*, April 7, 2021, available at <https://www.pewresearch.org/internet/fact-sheet/mobile/>, ("The share of Americans that own smartphones is now 85%, up from just 35% in Pew Research Center's first survey of smartphone ownership conducted in 2011. [...] Along with mobile phones, Americans own a range of other information devices. About three-quarters of U.S. adults now own a desktop or laptop computer, while roughly half own tablet computers.").

<sup>78</sup> Apple Market Research and Analysis, "iPhone Owner Study," October 2020, APL-EG\_06596359 – 62 at APL-EG\_06596361 – 2 [REDACTED]

<sup>79</sup> Apple Market Research and Analysis, "iPhone Buyer, FY20-Q4, Apple and Other Product Ownership," 2020, APL-EG\_06596446 – 51 at APL-EG\_06596448 – 9 ("Among iPhone Buyers FY20Q4: Other Apple products currently own and use: US: Any Mac (net) 29%... Among iPhone Buyers FY20Q4: Other non-Apple products currently own and use (slide 1): US: Computer (net) 63%; Smart TV 42%; Tablet (net) 22%; Gaming console (e.g., PlayStation, Xbox) 21%").

77. The fact that consumers have multiple devices to download and watch video streaming apps is consistent with other evidence from developers of video streaming apps. For example, in 2017, Netflix's VP of Product Innovation, Todd Yellin, stated that Netflix had over 104 million paid accounts and that about 65 percent of viewing was on a TV, 20 percent on a mobile device, and 15 percent on a computer.<sup>80</sup>

***2.3. Developers typically monetize video streaming apps through subscription transactions offered through a variety of platforms as well as through web browsers***

78. Video streaming app developers generally monetize video streaming app transactions through subscriptions and they make paid subscription transactions with consumers through a variety of video streaming app transaction platforms as well as directly through web browsers. Developers make it easy for customers to engage in video streaming app transactions across multiple devices. Customers typically have a device-independent account that enables purchases and content consumption (including saving content to watch in the future and remembering where the consumer was in a particular movie or TV show) to transfer between devices. Figure 17 provides evidence on single sign-on and possibility of enjoying video content across multiple devices. Each of the video streaming apps provides the ability to switch between devices. For example, a customer can start watching a program on one device, pause in the middle of the program and pick up where they left off on another device.

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<sup>80</sup> Nathan McAlone, "Netflix says it now has over 300 million 'viewers,'" *Business Insider*, October 26, 2017, available at <https://www.businessinsider.com/netflix-has-300-million-viewers-2017-10>.

**FIGURE 17**

*Monetization and portability of video streaming apps<sup>[1]</sup>*

App	Offers digital content for purchase <sup>[1]</sup>		For apps offering purchased digital content <sup>[2]</sup>
	In iOS app	Outside of iOS app <sup>[3]</sup>	Content purchased outside of iOS app accessible in iOS app <sup>[4]</sup>
1. Amazon Prime Video	✓	✓	✓
2. BET+	✓	✓	✓
3. Disney+	✓	✓	✓
4. HBO Max	✓	✓	✓
5. Hulu	✓	✓	✓
6. Netflix		✓	✓
7. Paramount+	✓	✓	✓
8. Peacock TV	✓	✓	✓
9. Philo	✓	✓	✓
10. Pluto TV <sup>[5]</sup>			—
11. Showtime	✓	✓	✓
12. Starz	✓	✓	✓
13. Tubi <sup>[5]</sup>			—
14. YouTube TV		✓	✓

Source: See my exhibit backup for full list of sources.

Note:

[1] Includes both subscription and non-subscription content. An app's designation is blank if the app does not offer digital content for purchase in the respective fields, if it could not be specifically confirmed whether the app offers digital content for purchase, or if the app only offers digital content for purchase to legacy customers (Netflix).

[2] An app's designation in the table is blank if the app does not offer digital content for purchase in the respective fields, if digital content for purchase is not portable to an iOS app, or if it could not be confirmed digital content for purchase is portable to an iOS app.

[3] Includes the ability to purchase digital content on an Android device; a mobile, desktop, or laptop web browser; a downloadable desktop or laptop app; or any PlayStation, Xbox, or Nintendo device.

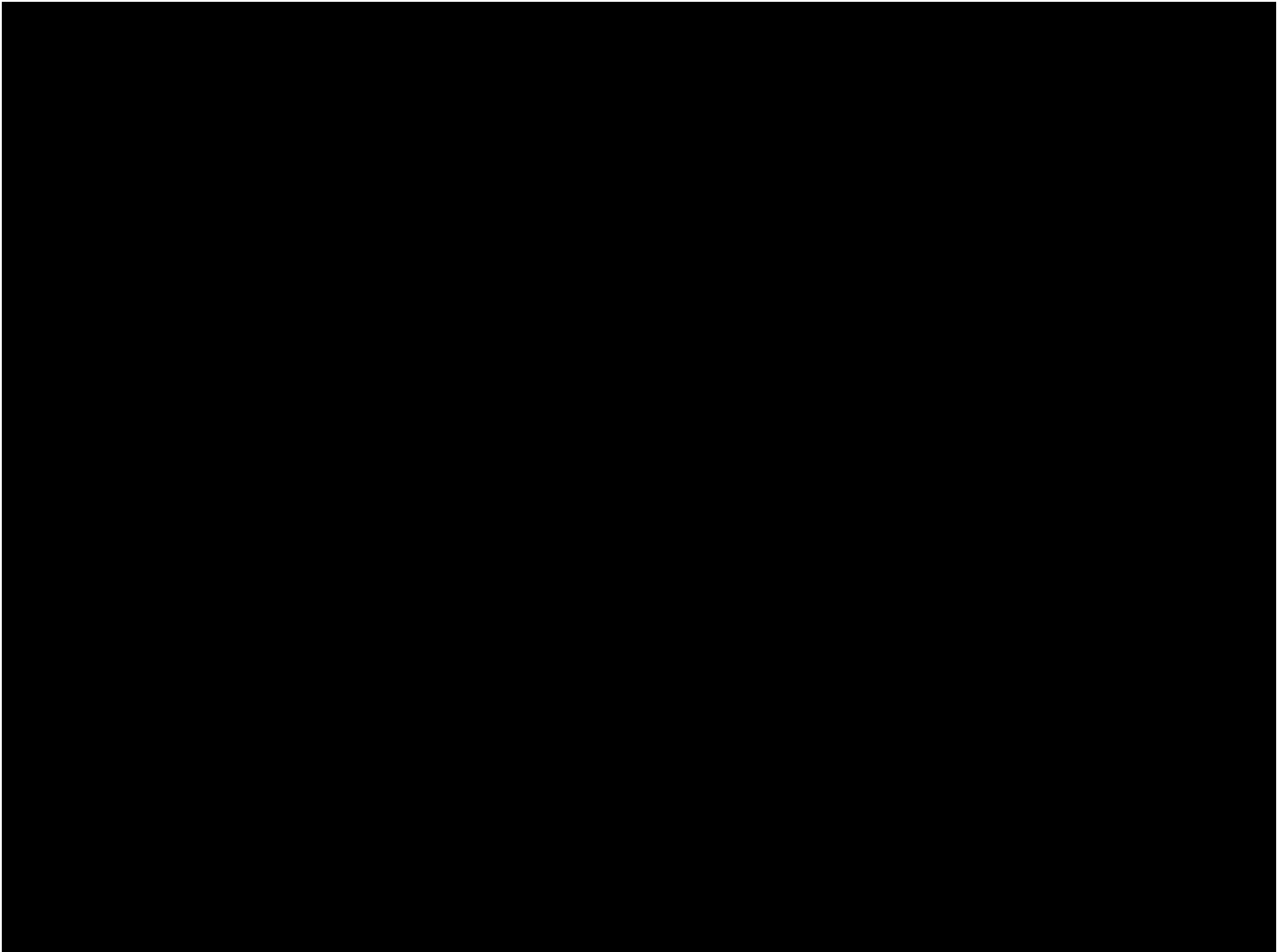
[4] The field shows "✓" if the app allows any content purchased outside of the iOS app to be accessible in the iOS app.

[5] Tubi and Pluto TV are free so they do not have digital content available for purchase.

79. Figure 18 shows that each video streaming app generates nearly all its App Store revenues from in-app subscriptions. In particular, BET+, HBO Max, Hulu, Netflix, Paramount+, Peacock TV, Philo, STARZ, YouTube TV, all have 100 percent of their App Store revenue from in-app subscriptions while SHOWTIME and Disney+ have more than 90 percent of their App Store revenue from in-app subscriptions. This is in contrast to game



apps, which, as I showed in Figure 25, generate almost all their revenue on the App Store (98 percent) through non-subscription in-app purchases.



80. Video streaming apps on iOS devices also generate revenue through other strategies beyond subscriptions sold through the App Store, some of which lead to paying Apple a commission (such as the purchase of individual titles or events) and some of which do not (such as in-app advertising or purchasing subscriptions outside of the App Store for use on iOS devices). Figure 19 shows the manner in which each video streaming app monetizes. For example, Amazon Prime Video and YouTube TV, allow consumers to purchase individual titles. In contrast, Pluto TV and Tubi are free for consumers to use and generate revenues entirely through advertising, which allows these two developers to avoid paying any commissions to Apple. Additionally, because Apple's reader rule does not require developers of video streaming apps to make paid transactions through the App Store for content consumed on iOS devices, Netflix and YouTube TV have chosen to sell all their

subscriptions outside of the App Store and hence also pay no commission to Apple. Netflix stopped allowing paid transactions on the App Store for new subscribers in December 2018, prior to which one could sign up and pay for a new subscription through the App Store.<sup>81</sup> Additionally, HBO Max and Paramount+ recently started offering ad-supported versions of their apps at lower prices.<sup>82</sup> Thus the same developer can choose different approaches to monetize its apps and shift these strategies over time.

**FIGURE 19**  
*Monetization methods for video streaming apps*

App	Subscription	Ads	Pay per title <sup>[1]</sup>
1. Amazon Prime Video	✓		✓
2. BET+	✓		
3. Disney+	✓		✓
4. HBO Max	✓	✓	
5. Hulu	✓	✓	✓
6. Netflix	✓		
7. Paramount+	✓	✓	
8. Peacock TV	✓	✓	
9. Philo	✓	✓	
10. Pluto TV		✓	
11. SHOWTIME	✓		✓
12. STARZ	✓		
13. Tubi		✓	
14. YouTube TV	✓	✓	✓

Source: See my exhibit backup for full list of sources.

Note: [1] Disney+, SHOWTIME, and Hulu offer Premier Access and pay-per-view, while Prime Video and YouTube TV offer rental and purchases for titles.

<sup>81</sup> Chris Welch, “Netflix Stops offering in-app subscriptions for new and returning customers on iOS,” *The Verge*, December 28, 2018, available at <https://www.theverge.com/2018/12/28/18159373/netflix-in-app-subscriptions-iphone-ipad-ios-apple>.

<sup>82</sup> Todd Spangler, “HBO Max with Ads Launches: What’s Different in the \$10 Monthly Plan,” *Variety*, June 2, 2021, available at <https://variety.com/2021/digital/news/hbo-max-with-ads-launch-pricing-1234986422/>.

81. In fact, each of the developers of the video streaming apps that I analyzed allows customers to pay for app transactions, including subscription fees, through multiple platforms as well as directly through the developers' websites. Figure 20 shows the current channels for purchase transactions for each video streaming app that I analyze.<sup>83</sup>

82. Developers utilize alternative transaction platforms to sell content to iOS users, including content that can be used on their iOS devices. Two of the 14 apps listed in Figure 20, Pluto TV and Tubi, generate revenues entirely through advertising and do not sell content to users. All the other twelve apps listed sell content to iOS users through other platforms. Seven apps, including BET+, Disney+, HBO Max, Paramount+, Peacock TV, SHOWTIME, and STARZ currently sell content through the Google Play Store. Every video streaming app that I analyze that offers content for sale in the App Store also currently allows consumers to purchase the content directly from the developer through the developer's website.

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<sup>83</sup> Some apps may have previously offered transactions through additional platforms that are not indicated in the figure since the apps no longer offer transactions on the platform. For example, Netflix previously offered subscription transactions through the App Store but stopped offering such transactions in December 2018. See ¶ 80.

**FIGURE 20**  
*Channels for making video streaming app purchase transactions*

<b>App</b>	<b>App Store</b>	<b>Google Play</b>	<b>Website</b>
1. Amazon Prime Video	✓		✓
2. BET+	✓	✓	✓
3. Disney+	✓	✓	✓
4. HBO Max	✓	✓	✓
5. Hulu	✓		✓
6. Netflix			✓
7. Paramount+	✓	✓	✓
8. Peacock TV	✓	✓	✓
9. Philo	✓		✓
10. Pluto TV			
11. SHOWTIME	✓	✓	✓
12. STARZ	✓	✓	✓
13. Tubi			
14. YouTube TV			✓

Source: See my exhibit backup for full list of sources.

83. Video streaming apps also offer purchase transactions through other platforms and locations that typically do not offer transactions for other types of apps, such as game apps. For example, some video streaming apps such as Hulu have chosen to offer subscription purchase transactions through apps on media players, like Roku and Fire Devices.<sup>84</sup> Other streaming apps, such as HBO Max, Peacock, STARZ and SHOWTIME have chosen to be

<sup>84</sup> “Managing a Roku-billed Hulu account,” Hulu Help Center, accessed on August 10, 2021, available at <https://help.hulu.com/s/article/manage-roku>; “Managing a Amazon-billed Hulu account,” Hulu Help Center, accessed on August 10, 2021, available at <https://help.hulu.com/s/article/manage-amazon>; “How do I manage subscriptions on my Fire TV?” Amazon, September 28, 2017, accessed on August 10, 2021, available at <https://www.amazonforum.com/s/question/0D54P00006zSoStSAK/how-do-i-manage-subscriptions-on-my-fire-tv>.

offered as a bundle through cable and internet service plans.<sup>85</sup> Developers of video streaming apps also sell gift cards through retail outlets, which is yet another channel for purchasing content. For instance, Netflix and Hulu sell gift cards through retailers such as Target, Best Buy and Amazon and allow customers to redeem their gift cards through their respective websites.<sup>86</sup>

84. As discussed previously, consumers typically have access to multiple devices, so consumers with iOS devices can make paid transactions through other transaction platforms and on other devices while consuming the content through the iOS app. Thus, alternative app transaction platforms and websites provide substitutes to the App Store for developers of video streaming apps for the purposes of making transactions with iOS users. In addition to having access to multiple devices to make video streaming app transactions, it is also the case that consumers who have chosen to make app transactions through a particular platform, such as the App Store, can switch to making transactions through another platform or through the developer's website. This demonstrates that app transactions through other platforms are substitutes for consumers that have chosen to make app transactions through the App Store. As described above, Apple's reader rule allows developers of video streaming apps to make transactions outside of iOS video streaming apps for content that can be consumed within the iOS video streaming app, while offering no paid transactions within the iOS app.<sup>87</sup> Figure 21 shows that, while all video streaming apps are able to take advantage of the reader rule, two developers in particular – Netflix and YouTube TV – have chosen to not offer subscription purchase transactions through the iOS app, while others have chosen to continue to offer their subscriptions through the App Store. This is in contrast to other types of apps, such as

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<sup>85</sup> "Top entertainment + reliable internet on 1 bill," AT&T, accessed on August 10, 2021, available at <https://www.att.com/bundles/directv-internet/>; "Peacock," Xfinity, accessed on August 10, 2021, available at <https://www.xfinity.com/peacock>.

<sup>86</sup> "Hulu gift cards," Hulu, accessed on August 4, 2021, available at <https://help.hulu.com/s/article/gift-cards>; "Netflix Gift Cards," Netflix, accessed on August 4, 2021, available at <https://help.netflix.com/en/node/32950>.

<sup>87</sup> App Store Review Guidelines, 3.1.3(a) ("Reader" Apps: Apps may allow a user to access previously purchased content or content subscriptions (specifically: magazines, newspapers, books, audio, music, and video)."); Deposition of Carson Oliver (Director of Business Management, Apple App Store), January 26, 2021, pp. 85–86, 93 ("The Reader Rule allows for digital goods and services to be consumed within apps that are purchased outside of those apps... If a user purchases the digital good and service outside of the app, and that can be on their iOS device outside of the app, for example, on Web, Apple would not take a commission on that sale of that digital good or service, even when it is consumed within the app... The Reader Rule does not require that digital good or service is made available to users for purchase within an app or game.").

game apps, that must offer consumers the ability to purchase content within the iOS app if the developer also offers consumers the ability to purchase the content outside of the iOS app.

***2.4. App transactions across video streaming app platforms are substitutes, not complements***

85. The real-world example of Netflix shows that video streaming app transactions across app transaction platforms are substitutes, not complements.

86. In December 2018, Netflix chose to no longer allow any paid transactions through the App Store for new iOS Netflix app users. This removed the possibility for any *new* iOS accounts to pay for Netflix's service within the iOS app, while existing iOS accounts that already paid for Netflix through the iOS app could continue to pay through the App Store.<sup>88</sup> Any iOS accounts that had not already downloaded the Netflix app would be required to sign-up for a Netflix subscription through other platforms or through Netflix's website, including through the website on an iOS device. Thus, as before, consumers that signed up for a Netflix subscription on the Netflix website could still watch all Netflix content on their iOS apps.

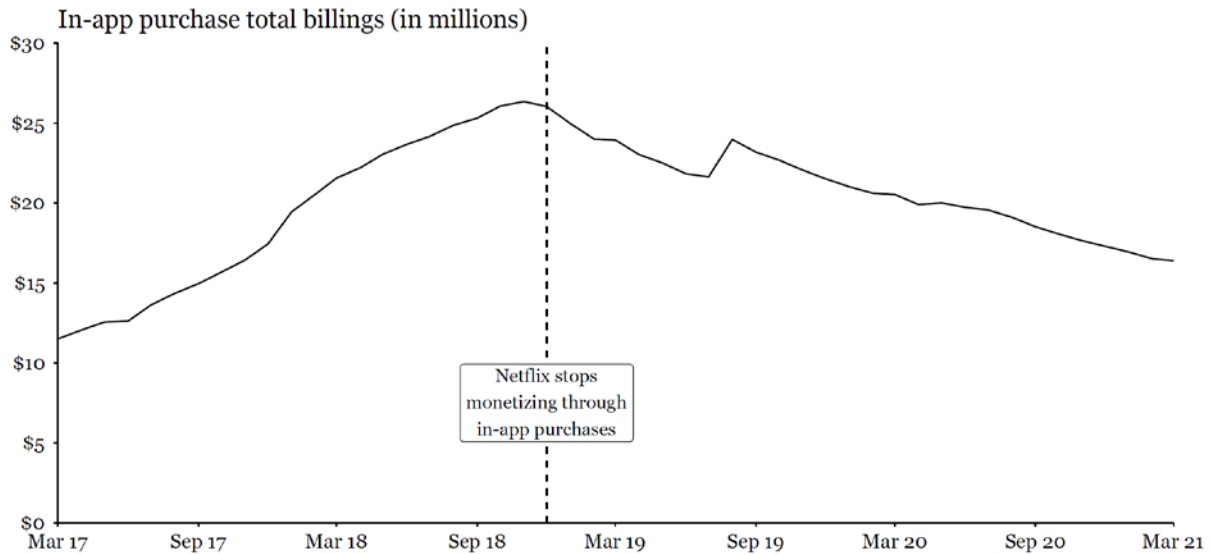
87. Figure 21 shows that, Netflix's revenues from in-app purchases on the App Store declined after it chose to stop offering new subscription purchases through the App Store with the only remaining source of App Store revenues being subscriptions already maintained by iOS accounts. However, Figure 22 shows that at the same time, Netflix's overall user base, measured by the total number of paid Netflix memberships, did not decline after it stopped monetizing through the App Store; instead, it continued to grow without a discernible break. This is not surprising as Netflix typically adds and maintains users without charging them through iOS – in fact only a small portion of Netflix streaming revenues (i.e. 3.2 percent in the U.S. in 2018) comes from the payments its customers make through iOS versus through other avenue. (See Figure 21 footnote)

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<sup>88</sup> Netflix did not cancel existing subscriptions when it turned off in-app purchases for new iOS accounts. This means that Netflix can continue to generate revenue through in-app purchases for legacy subscribers as well as encouraging those subscribers, if it chooses, to pay for their subscription through other avenues and enjoy the benefits of the iOS app without any commission being paid to Apple.

**FIGURE 21**

*Netflix in-app purchase total billings generated in the U.S. App Store, by month (March 1, 2017 – March 31, 2021)*



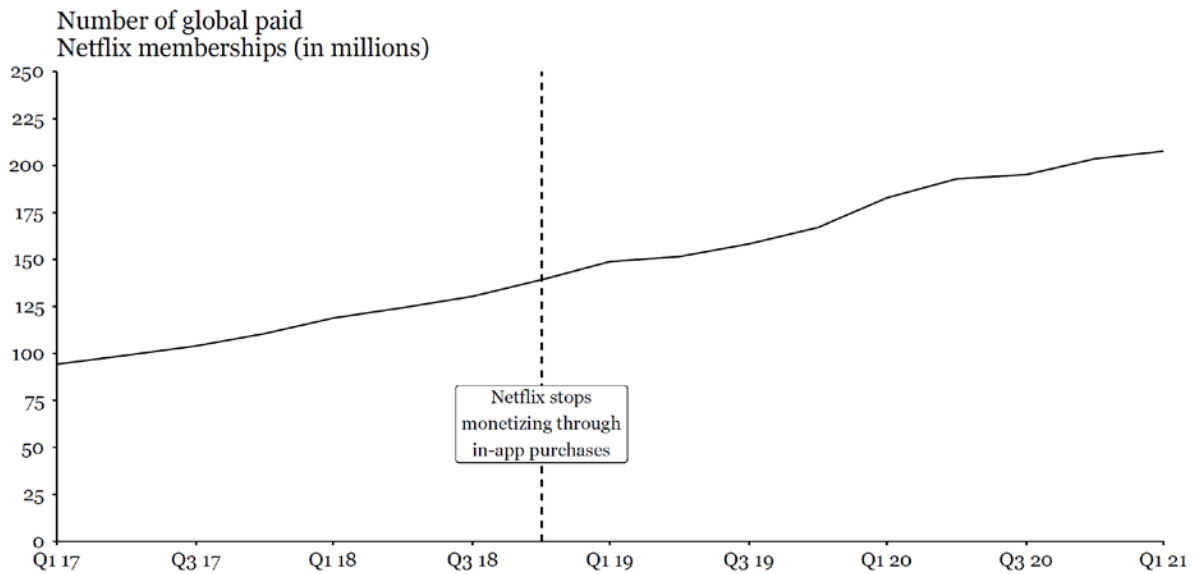
Source: Apple Transaction Data; Manish Singh, “Netflix permanently pulls iTunes billing for new users,” VentureBeat, December 28, 2018, available at <https://venturebeat.com/2018/12/28/netflix-permanently-pulls-itunes-billing-for-new-users/>, accessed on July 29, 2021; Netflix 2018 10-K Report

Note: Netflix started monetizing through in-app purchases on September 15, 2015. Netflix stopped allowing new users to subscribe through iOS in-app purchases in December 2018. The Netflix app is identified using adam\_id or parent\_adam\_id equal to 363590051. Only transactions from in-app purchases are included. In 2018, Netflix generated \$241 million in revenue through the U.S. App Store and \$7.6 billion in total U.S. streaming revenue. Netflix’s revenue through the App Store accounted for 3.2% of Netflix’s total U.S. streaming revenue in 2018. See Appendix F for details regarding Apple transaction data processing.



**FIGURE 22**

*Netflix global paid streaming memberships, by quarter (January 1, 2017 – March 31, 2021)*



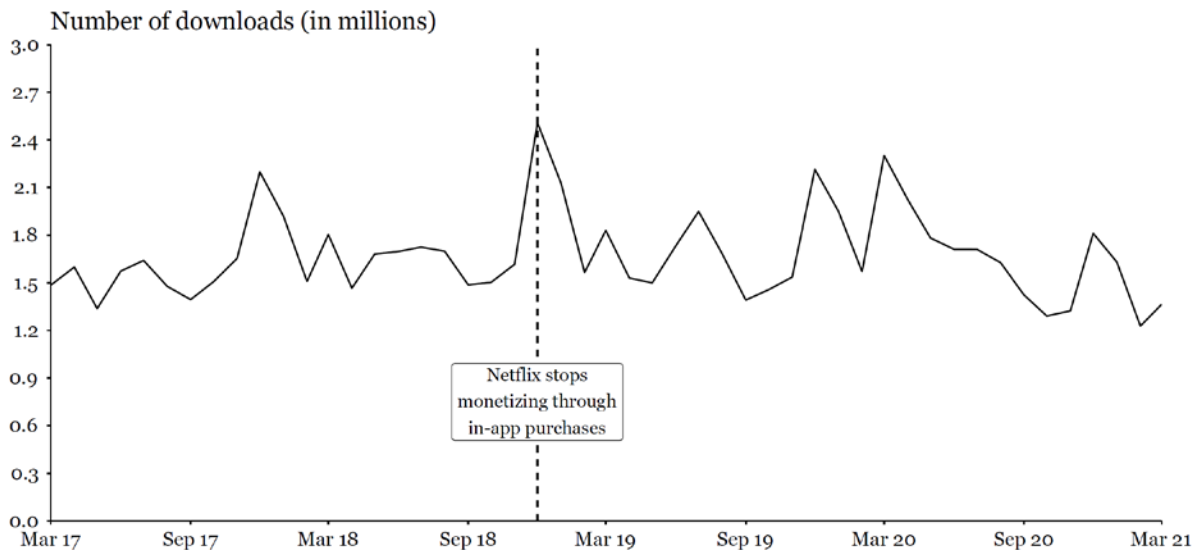
Source: Netflix 10-Q and 10-K Reports; Manish Singh, "Netflix permanently pulls iTunes billing for new users," VentureBeat, December 28, 2018, available at <https://venturebeat.com/2018/12/28/netflix-permanently-pulls-itunes-billing-for-new-users/>, accessed on July 29, 2021

Note: Netflix global paid streaming memberships data are based on the number of global paid streaming memberships at the end of each quarter. Netflix stopped allowing new users to subscribe through iOS in-app purchases in December 2018.

88. Notably, the decision to stop allowing new iOS accounts to pay for their subscriptions in the iOS app (i.e., make paid transactions) did not lead to any discernible change in the monthly number of *new* downloads of the Netflix iOS app. Figure 23 shows that Netflix continued to gain large numbers of new iOS accounts even after Netflix shifted to monetizing new iOS accounts entirely through methods that do not generate commissions for Apple.

**FIGURE 23**

*Netflix initial downloads in the U.S. App Store, by month (March 1, 2017 – March 31, 2021)*



Source: Apple Transaction Data; Manish Singh, “Netflix permanently pulls iTunes billing for new users,” VentureBeat, December 28, 2018, available at <https://venturebeat.com/2018/12/28/netflix-permanently-pulls-itunes-billing-for-new-users/>, accessed on July 29, 2021

Note: Netflix started monetizing through in-app purchases on September 15, 2015. Netflix stopped allowing new users to subscribe through iOS in-app purchases in December 2018. The Netflix app is identified using adam\_id or parent\_adam\_id equal to 363590051. Only original transactions from initial downloads are included. See Appendix F for details regarding Apple transaction data processing.

89. These figures show that while Netflix stopped allowing *new* iOS accounts to *pay* for their subscriptions through iOS, there was no discernible change in the addition of new accounts on iOS. Those new accounts, by definition, had to substitute to other forms of transactions, including the Netflix website or other video streaming app transaction platforms, to make their subscription payments. This demonstrates that subscription transactions outside of the App Store are substitutes for subscription transactions through the App Store for developers and consumers of video streaming apps. The fact that new iOS accounts (for whom the policy change applied) continued to download the Netflix app on their iOS devices after Netflix stopped monetizing its app through the App Store demonstrates how video streaming app developers can take advantage of Apple’s reader rule to easily separate where consumers pay for content and where those consumers consume that content.

***2.5. Video streaming app developers can choose to participate in Apple’s Video Partner Program to obtain a lower commission rate***

90. Video streaming app developers can also participate in Apple’s Video Partner Program which allows developers to pay a 15 percent commission rate on all download and in-app purchase transactions through the App Store. To qualify for the Video Partner Program, developers have to integrate certain Apple technologies, such as Siri, AirPlay, and single sign-on; allow consumers to make in-app purchases through the iOS app (i.e., developers cannot opt out of making transactions within the App Store as allowed by the reader rule); and be available on both iOS and tvOS, among other criteria.<sup>89</sup> This program is therefore unique to video streaming apps — other types of apps, such as game apps, are not eligible to participate.

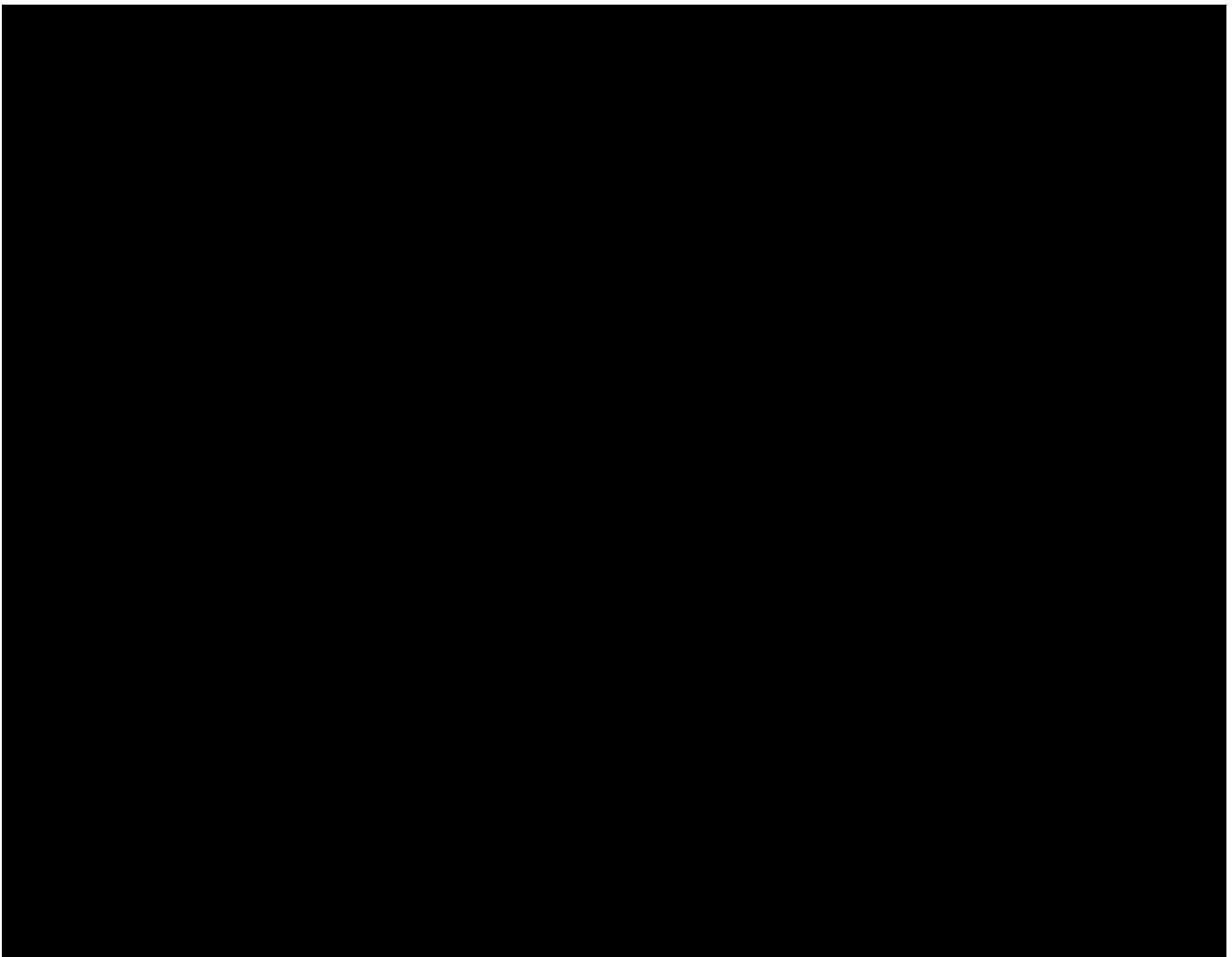
91. Apple reports that over 130 premium subscription video entertainment providers have signed up for the Video Partner Program globally as of fall 2020.<sup>90</sup> In Figure 24, I show whether each of the video streaming apps that I analyze currently participates in the Video Partner Program and the date the app joined the program. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] All

Video Partner Program participants also monetize outside the App Store and are therefore able to benefit from lower commission rates on the App Store while continuing to take advantage of other distribution options.

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<sup>89</sup> “Apple Video Partner Program,” *Apple Developer*, accessed on August 10, 2021 available at <https://developer.apple.com/programs/video-partner/>.

<sup>90</sup> “Apple Video Partner Program,” *Apple Developer*, accessed on August 10, 2021 available at <https://developer.apple.com/programs/video-partner/>.



\* \* \*

92. Overall, these analyses indicate that there is a well-defined market for video streaming app transactions and that developers and consumers can, and do, substitute between transactions on the App Store with transactions on other app transaction platforms and with direct distribution by developers. The App Store faces competition from alternatives for video streaming app transactions, which reinforces my prior analyses that indicate that the existing commission rate structure employed by the App Store is competitive.

### **3. THE MARKET FOR DIGITAL GAME TRANSACTIONS AND THE MARKET FOR VIDEO STREAMING APP TRANSACTIONS HIGHLIGHT THE FLAW IN COMBINING TRANSACTIONS FOR ALL APPS INTO A SINGLE MARKET**

93. My analyses of the market for digital game transactions and the market for video streaming app transactions demonstrate that is fundamentally flawed to assume, as Plaintiffs' experts do, that there is a single market that combines all transactions for iOS apps. These two markets illustrate how the available substitutes to transactions on the App Store, the competitive conditions for transactions, and the different business models employed by game app developers and video streaming app developers differ across these two transaction markets and between the potentially multiple other markets for transactions of other types of apps.

94. The contrasts between these two markets is highlighted by the fact that developers of video streaming apps and developers of games (as well as developers of other types of apps) do not face common policies for transacting on the App Store. While video streaming apps are subject to the reader rule and can participate in Apple's VPP, game apps do not benefit from either of these two programs. In fact, no non-reader app can take advantage of the reader rule, and no other apps, including other apps in the Entertainment app genre can take advantage of the VPP.

95. The available substitutes for transactions also differ between game apps, video streaming apps, and other apps. Game apps are transacted through platforms for mobile devices, Windows PCs and Macs, and consoles. While video streaming apps can be download to mobile devices, Windows PCs and Macs, and some consoles, they can also be downloaded to dedicated media players, such as Roku TV and Fire TV, and smart TVs. Although they are also available on Windows PCs and Macs, video streaming apps are typically streamed through a browser rather than downloaded to the computer, as is the case with many game apps. Other types of apps are available on different sets of devices; for example, word or spreadsheet processing apps or photo editing apps, are not typically used on consoles.<sup>91</sup>

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<sup>91</sup> Microsoft Office, for instance, is available on mobile devices, PCs, and Macs, but not on consoles. Microsoft, "Microsoft 365 and Office Resources," available at <https://www.microsoft.com/en-us/microsoft-365/microsoft-365-and-office-resources/?rtc=1#coreui-heading-5dcqxz4>, accessed on January 26, 2021. The photo editing app Affinity Photo is available for PCs, Macs, and iPads, but not for consoles. Affinity, "Let's get technical," available at <https://affinity.serif.com/en-us/photo/full-feature-list/>, accessed on January 27, 2021.

96. The business models adopted by game app developers and video streaming app developers also differ from each other as well as from other types of apps, and these differences impact the likelihood that developers of these apps substitute between transactions on the App Store and transactions on alternative platforms or directly with consumers. I showed in Figure 25 that game developers rely heavily on purchases of non-subscription in-app content to monetize their apps. However, video streaming app developers take the opposite approach and rely heavily on subscription purchases to monetize their apps (see Figure 19).

## 1. APPENDIX E: MARKET OUTCOMES DEMONSTRATE THAT APPLE LACKS MONOPOLY POWER IN PLAINTIFFS' ALLEGED MARKET

1. In this Appendix, I present analyses that demonstrate that Apple does not have market power in Plaintiffs' alleged market for iOS app and in-app purchase distribution.<sup>1</sup> In particular, while I disagree with Plaintiffs' alleged market for iOS app and in-app purchase distribution, I analyze market outcomes to assess Apple's potential market power in this alleged market.<sup>2</sup> Professor Willig discusses in his Expert Report how market outcomes such as price, quantity, and quality can help in evaluating claims of market power.<sup>3</sup> I thus consider whether there is evidence that Apple has exercised market power in Plaintiffs' alleged market through increasing prices, restricting output, or reducing quality. If Apple possessed market power in Plaintiffs' alleged market *and* this market power had caused harm to consumers and developers, then one would expect to see that Apple has constrained output, reduced quality, raised prices, or some mixture of the three.

2. As Professor Schmalensee explains in his report, the analysis of market power in the context of a two-sided transaction platform such as the App Store requires correctly defining the price of a transaction. The price in this context must be the total price Apple charges for the transaction rather than the price charged to one side of the platform, which is often zero. In the case of the App Store, the total transaction price to both sides of the market is the commission charged by the App Store, which is also often zero.<sup>4</sup> In fact, over 96 percent of all download transactions by proposed consumer class members on the App Store are free to download and therefore pay no commission.<sup>5</sup> In these cases, developers who wish to monetize their apps profit by either charging consumers outside the App Store or by alternative monetization approaches including advertising.<sup>6</sup> These zero commission

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<sup>1</sup> A full analysis of whether Apple has market power is beyond the scope of my assignment; however, I present analyses here in response to Plaintiffs' experts' assertion that Apple's supposed App Store profit margins are indicative of Apple exercising market power. I reserve the right to provide more analyses on whether Apple has market power at a later date.

<sup>2</sup> See Section 7.

<sup>3</sup> Willig Report, VIII.A.

<sup>4</sup> Schmalensee Report, Section IV.B.1.a.

<sup>5</sup> See my workpapers.

<sup>6</sup> Deposition of Carson Oliver, pp. 106–107 (“Q...So can you give me a ballpark in terms of how you break it down in your mind, how many [business models] you’re thinking of? A Well, I would note that many of the models that we see today are hybrid models that leverage multiple types of, kind of, revenue streams. If you were to count all the iterations of the hybrid models, you know, it’s fairly complex. But there are probably, you know, less than 10 or 20, you know, unique types that could then, again, be hybridized. Q And are these models models [sic] that Apple has come up with to make available to developers, or how do they come about? A I would say that most of these models predate or the creation of these models predate my time within Apple. And I would say that Apple does not create these business models. We -- we try to support our developer community by facilitating the different types of business models that they believe would be successful in their apps.”).



transactions are necessary to include when considering the price charged by the App Store for app transactions overall as well as when calculating the total number of transactions on the App Store.

***1.1. Evidence shows that Apple has not exercised market power to increase commission rates or prices***

3. The evidence shows that Apple does not charge supracompetitive prices nor has Apple increased commission rates. The evidence, in fact, points to the contrary. As I showed in Section 5.5, Apple's commission rate is similar to the headline commission rates charged by other app transaction platforms through nearly all of the class period and continues to be similar to the majority of app transaction platforms (both for game apps and non-game apps).<sup>7</sup> In addition, I showed in Section 5.2.3 how Apple has lowered its commission rate over time on a number of types of transactions. Here I exhibit that developers are increasingly taking advantage of monetization strategies that allow them to pay zero commission to Apple on transactions through the App Store (Section 1.1.1). I also show that the average commission rate on all downloads for all apps on the App Store has declined while the average commission rate on in-app purchases has remained constant (Section 1.1.2).<sup>8</sup> These four pieces of evidence are all inconsistent with Apple having market power to increase commission rates on app transactions.

***1.1.1. The shift by developers to monetization strategies that do not incur commissions is inconsistent with the exercise of market power***

4. Evidence shows that developers are increasingly taking advantage of monetization strategies that allow them to pay zero commission to Apple on transactions through the App Store. In particular, free-to-download apps do not pay any commission to the App Store, and Apple's own data show that developers have generally shifted from paid-to-download apps (which incur a commission) to free-to-download apps, potentially with future in-app purchases (which incur a commission only if the consumer makes an in-app purchase).

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<sup>7</sup> See e.g., Figure 19, Figure 20, and Figure 21.

<sup>8</sup> A commission rate that blends downloads and in app payment transactions would show an increase over time. However, this is solely due to the fact that facing constant or declining prices, developers are choosing to make greater use of in-app payment transactions. While this increases commissions, this rise is commensurate with increases in developer revenue and consistent with developers gaining additional value as they are choosing to perform more in-app purchase transactions at the same or decreased prices.

5. The Apple transaction data allow me to establish two important facts regarding free downloads on the App Store:

- First, free-to-download app downloads through the App Store, which are not subject to Apple commissions, are much larger in number than paid app downloads or in-app purchases.<sup>9</sup>
- Second, developers have shifted away from paid-to-download apps toward free-to-download apps with in-app purchases.
- Third, the fraction of free-to-download apps without in-app purchases (which pay no commissions) [REDACTED]

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<sup>9</sup> This does not include re-downloads of apps that iOS devices already previously downloaded.

6. Exhibit 1 shows the proportion of transactions on the App Store for all apps that are free downloads, paid downloads, and in-app purchases.<sup>10</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

7. Exhibit 2 shows that over time, an increasing majority (up to 80 percent in FY2021) of apps are not subject to any Apple commission, as they are free-to-download and offer no in-app purchases. This is indicative of the growing utilization of alternative monetization that is not subject to a commission, even though Apple continues to provide the initial download

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<sup>10</sup> As discussed previously in Section 7, I disagree with Plaintiffs' conclusion that there is a single market that combines together all iOS apps. I am considering all apps on the App Store to test Plaintiffs' experts' contention that Apple has market power in Plaintiffs' alleged market.

transaction and all accompanying support to both developers and consumers, including providing app updates and re-downloads over the lifetime of the app.

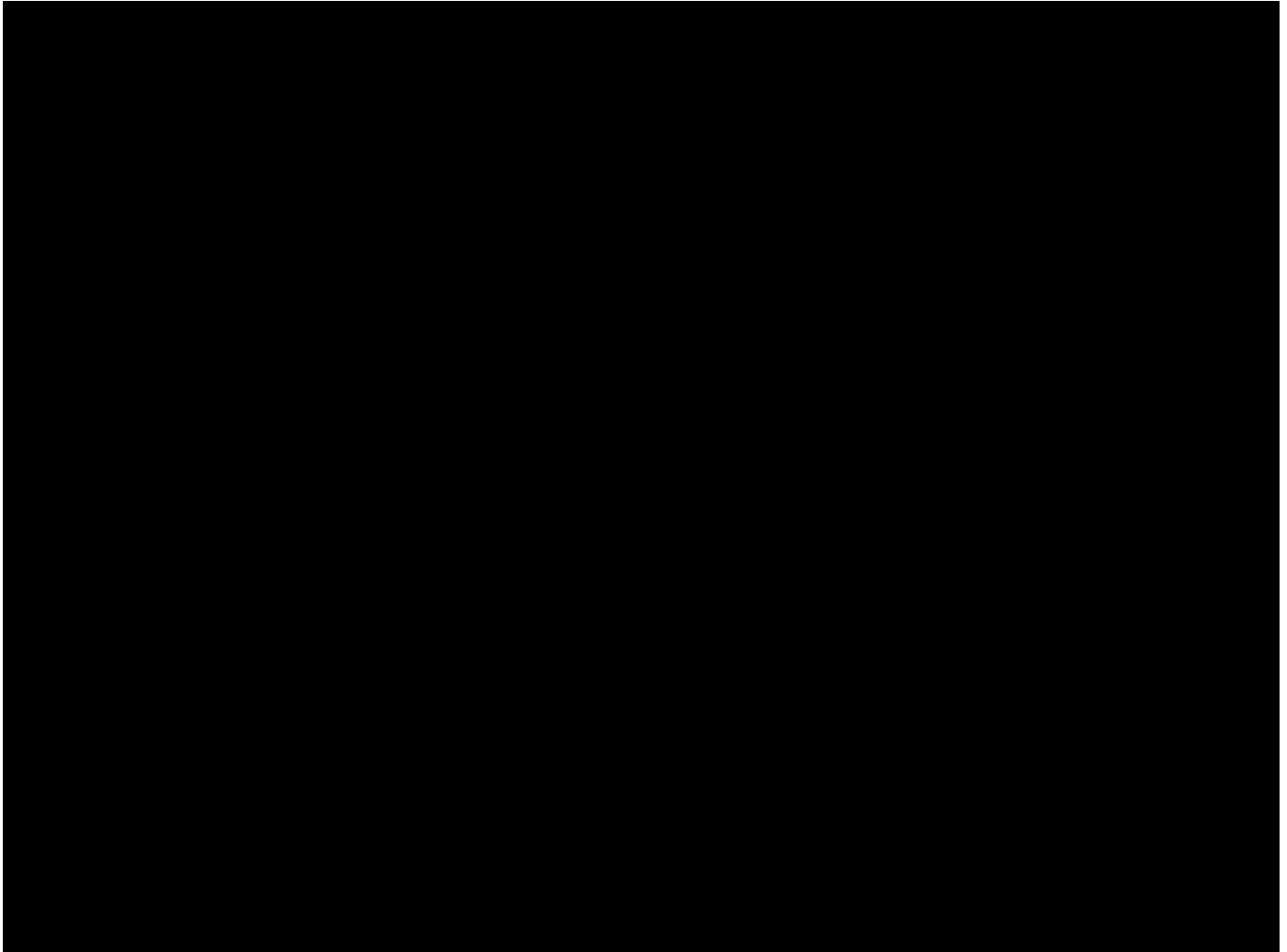
*1.1.2. Changes in the average commission rate charged by the App Store and the average dollar value of commissions paid to Apple since launch are inconsistent with the exercise of market power*

8. Because of the two-sided nature of the App Store and the fact that developers do not pay a commission for the download of a free-to-download app, it is useful to define an average commission rate charged to developers. I refer to the “average commission rate” as a measure of the commission rate charged by Apple that includes both free and paid transactions in the data by assigning a 0 percent commission rate to free transactions.<sup>11</sup>

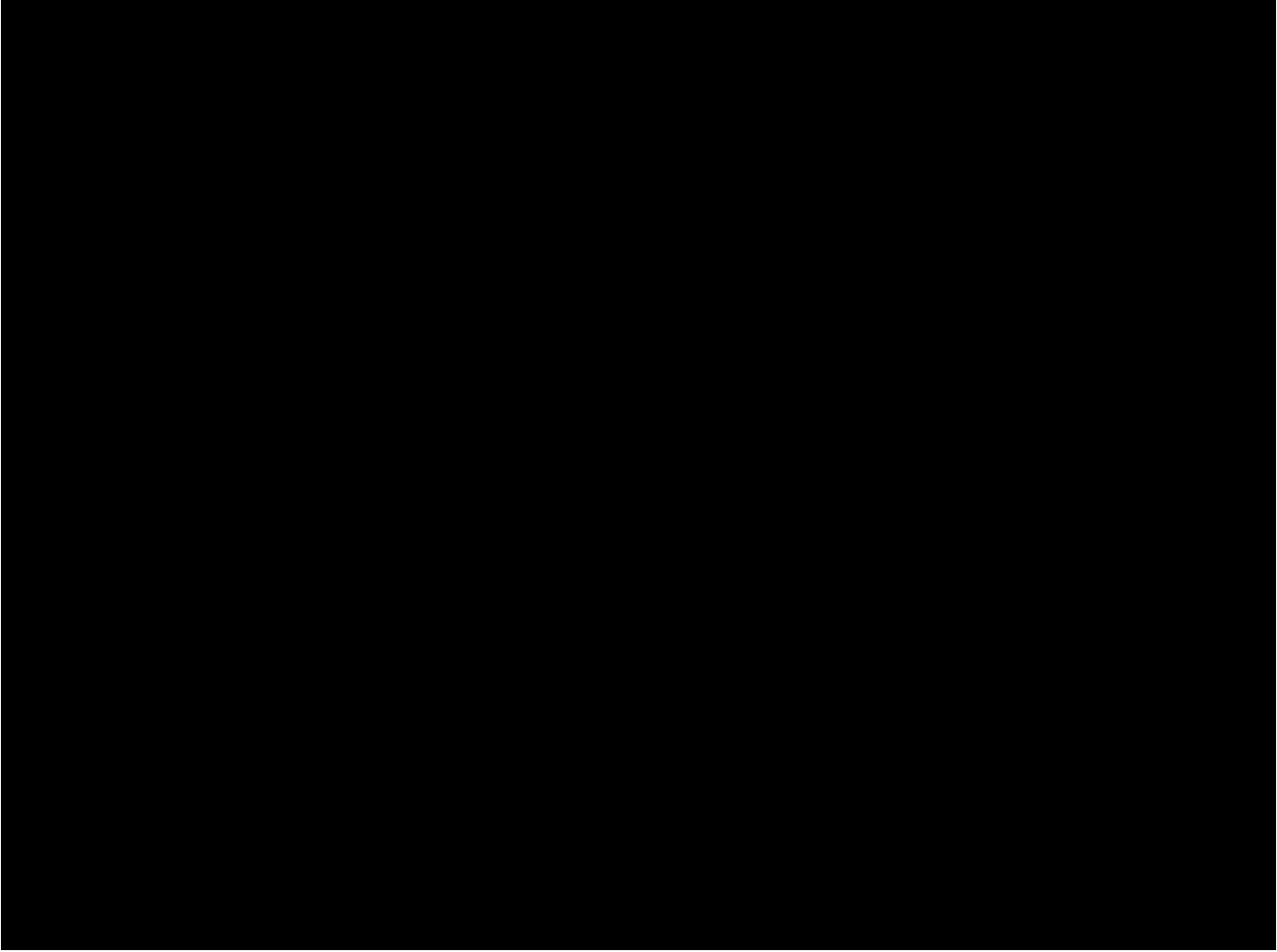
9. In Exhibit 3, I look at the average commission rate per download transaction on the App Store over time. The shift toward free downloads previously discussed is reflected in the average commission rate paid per download transaction: the average commission rate has decreased over time after accounting for free transactions, consistent with developers’ shift from paid downloads to free downloads combined with greater use of in-app purchases and other types of monetization.

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<sup>11</sup> Technically, the commission rate on a free transaction is undefined since the revenue on the transaction is zero. However, to reflect the fact that the developer does not pay any commission on the transaction, I assign a commission rate of 0 percent to free transactions.



HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY  
SUBJECT TO PROTECTIVE ORDER



10. This lower average commission rate on download transactions has not been coupled with an increasing average commission rate on in-app purchases. In Exhibit 4, I calculate the average commission rate in each quarter for in-app purchases on the App Store, starting after the introduction of in-app purchases on the platform in June 2009. The data show a stable average commission rate on in-app purchases over time.<sup>12</sup> As I showed in Exhibit 2, there has been a significant increase in the volume of in-app purchases on the App Store over the same period as more app developers have shifted from paid-to-download apps to free-to-download apps with in-app purchases. Thus, developers are seeing value in selling in-app purchases and are willing to incur commissions for these game transactions even though they could choose to monetize their apps in alternative ways.

11. In dollar terms, the commission earned by Apple depends on the price the developer sets for an app download or an in-app purchase. If developers choose to raise (or lower) the price

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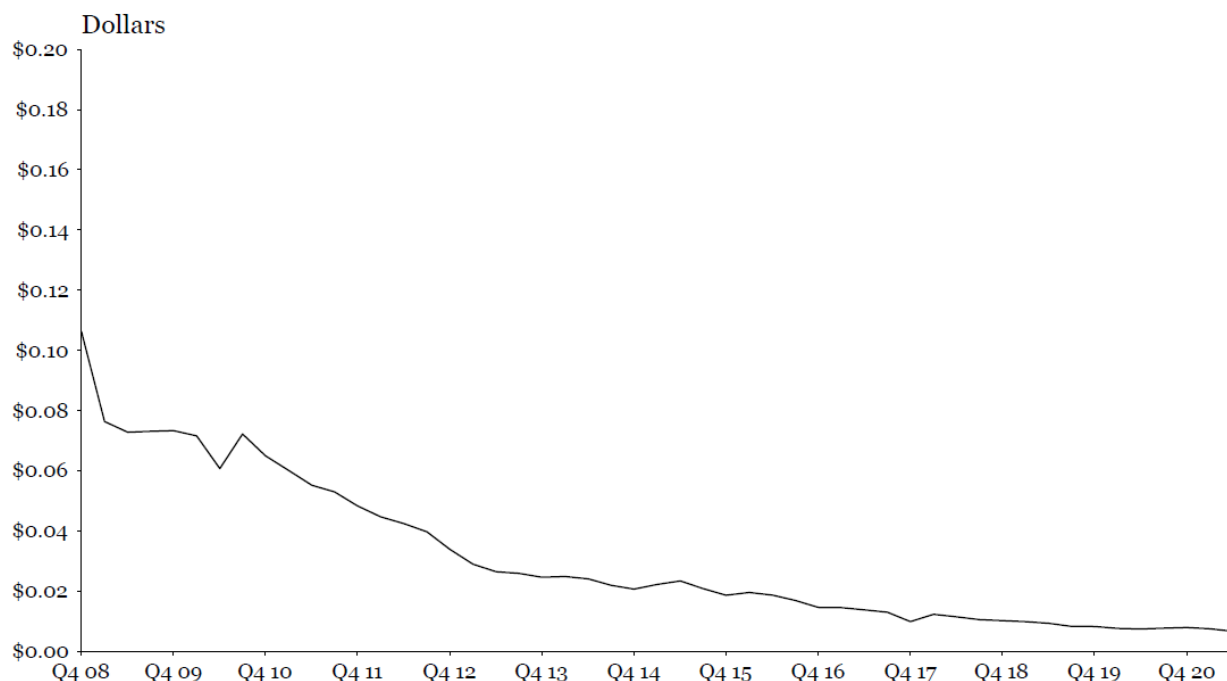
<sup>12</sup> The average commission rate for in-app purchases is slightly below 30 percent. This can occur for two reasons. First, some in-app purchases in the data are free and therefore do not generate a commission for Apple. Second, more recently, the introduction of the 15 percent commission rate on subscription renewals after the first year would also lower the average commission rate.

of downloads or in-app purchases, the dollar amount of Apple's commission will rise (or fall) without any change in Apple's commission rate.

12. The average commission paid in dollars for initial downloads and in-app purchases can also be used to assess whether there is evidence of Apple possessing market power. Exhibit 5 and Exhibit 6 show the average commission paid in dollars for initial downloads and in-app purchases on the App Store over time. Apple's average commission in dollar terms has fallen over time for initial downloads, reflecting the shift to free-to-download apps (Exhibit 5). For in-app purchases, Apple's average commission in dollar terms has risen over time due to increases in the average price that developers themselves have chosen to charge consumers for in-app purchases (see Exhibit 6). I show in Exhibit 7 that the median price of an in-app purchase over time follows a similar path as the average price of an in-app purchase over time. As Apple has not increased its commission rate from 30 percent (and has in fact decreased it for certain transactions), any increase in the dollar amount of commissions that Apple receives for in-app purchases is driven by the higher prices that developers have set (and are earning) for these transactions.

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**FIGURE 5**  
*Average commissions from App Store initial downloads (July 10, 2008 – March 31, 2021)*

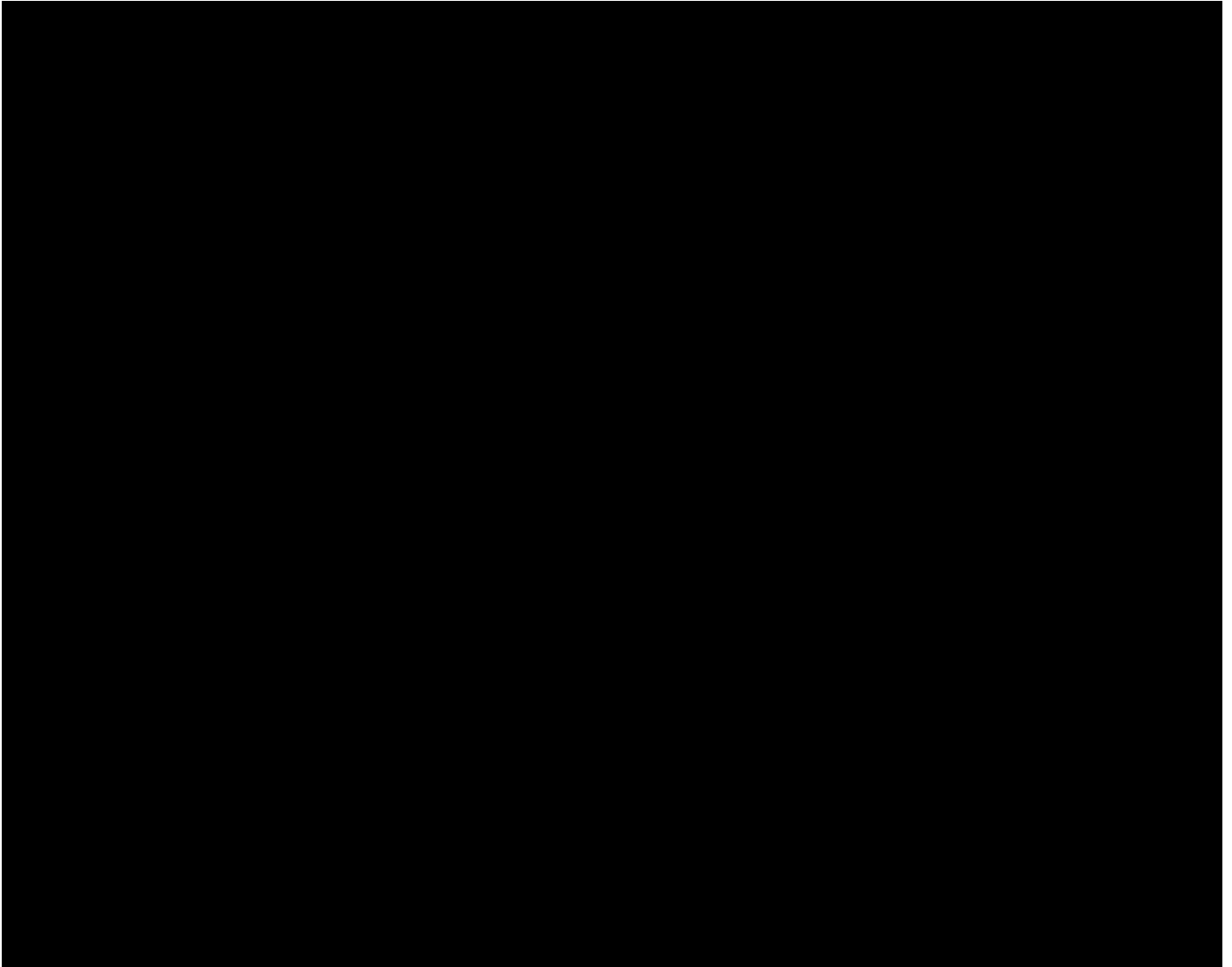


Source: Apple Transaction Data

Note: Commission is calculated for each transaction, and a simple average is calculated across transactions per quarter. Only original transactions categorized as initial downloads are included. Transactions where Apple is the developer are excluded. See Appendix F for details regarding Apple transaction data processing.

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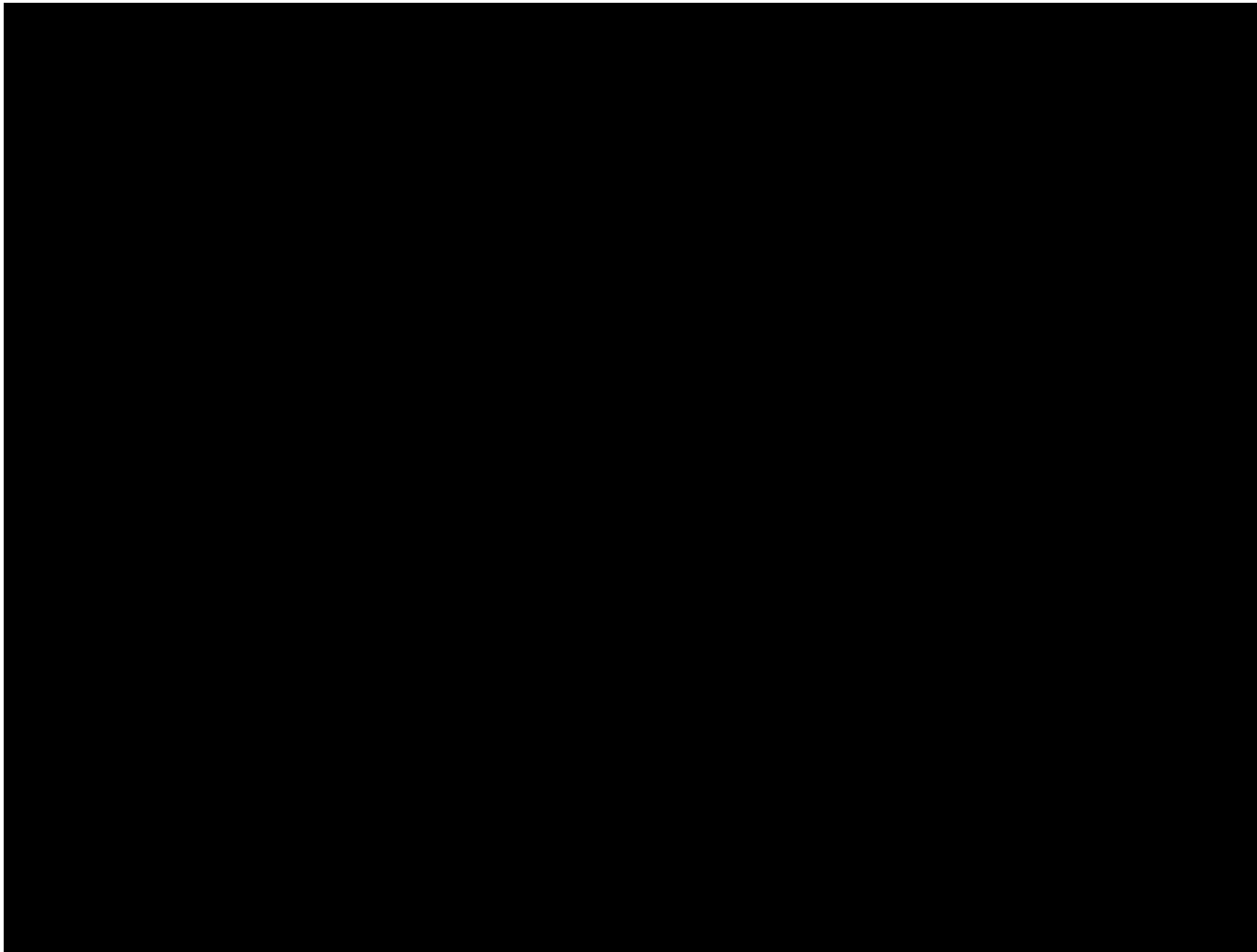
*1.2. Evidence does not show that Apple has exercised market power to reduce output*

13. The evidence shows that Apple has not exercised market power to reduce output. The total number of app transactions on the App Store has increased over time, as has developer revenue earned on the App Store (i.e., after subtracting commissions to Apple) from paid app transactions (Section 1.2.1). In addition, sales of iOS devices and other devices on which consumers perform digital game transactions have increased over time (Section 1.2.2). This evidence is inconsistent with Apple having market power to reduce output of iOS app transactions.

*1.2.1. Total output of digital game transactions on the App Store has increased over time*

14. If Apple were exerting market power, I would expect total output on the App Store to be reduced. However, evidence shows the opposite: output has increased since the launch of the App Store.

15. I show in Exhibit 8 that the total number of app transactions on the App Store has increased significantly over time. In Exhibit 9, I show that the total revenues earned by developers (i.e., the amount paid by the user minus the commission paid to Apple) from paid app downloads and in-app purchases on the App Store has also increased significantly. Between 2010 and 2020 calendar years, total annual revenue for developers has increased by more than [REDACTED]<sup>13</sup> Thus, there has been significant growth in transactions and net revenue to developers from paid transactions.



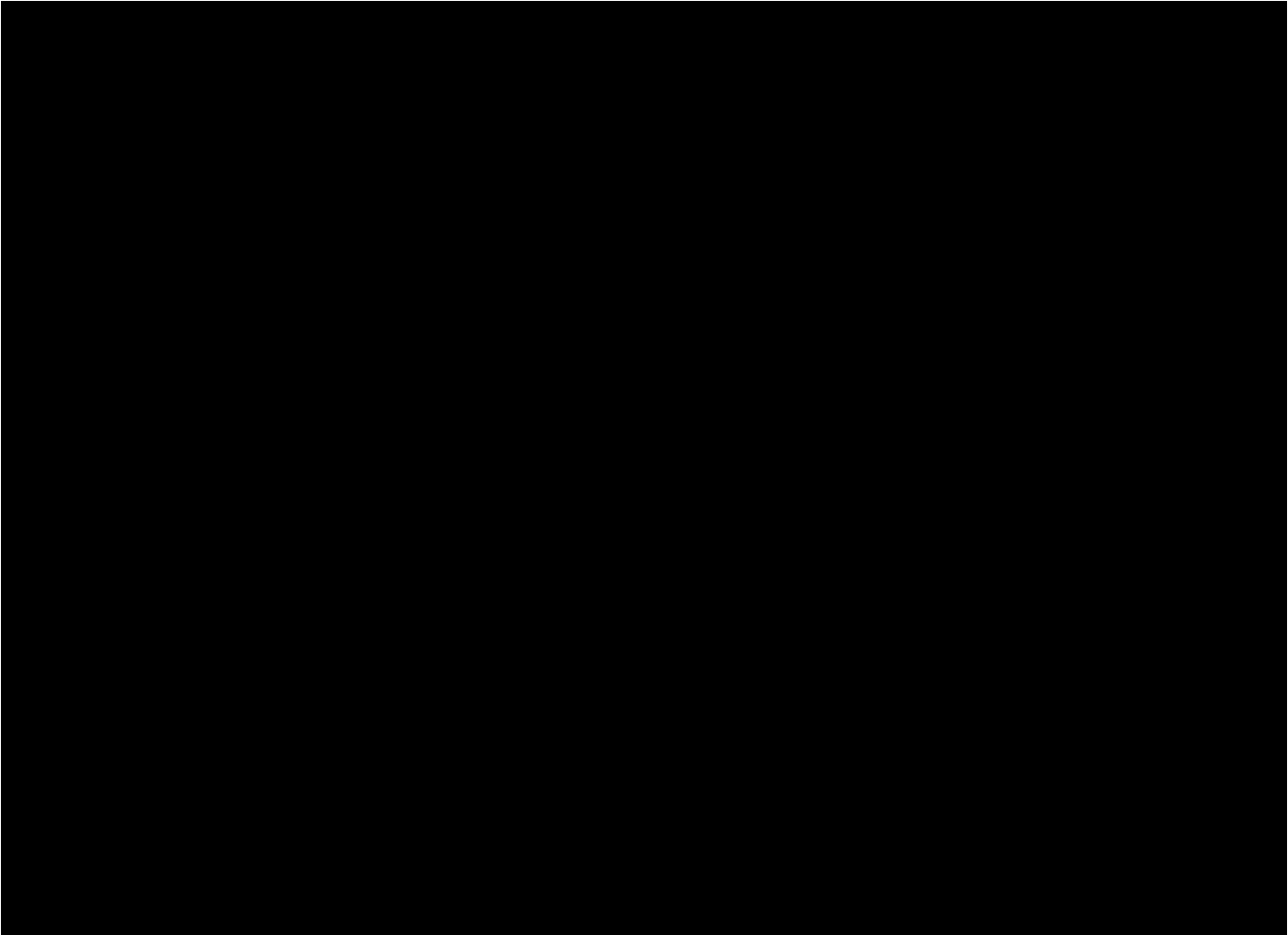
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<sup>13</sup> See my workpapers.

*1.2.2. Sales of Apple's devices as well as other devices have increased over time*

16. Sales of iOS devices that can be used for app transactions have increased since the launch of the iPhone and the iPad. This growth in devices is another indicator that Apple has not exerted market power.

17. In Exhibit 10 I plot unit sales of Apple iPhones and iPads in the U.S. from Apple FY2009 to FY2019. Unit sales of these iOS devices experienced significant growth after launch and annual sales of iOS devices continue to remain high. For instance, from 2009 to 2019, the number of iPhones sold in the U.S. increased from 9.7 million in 2009 to [REDACTED] 2019. Apple also sold [REDACTED] in the U.S. in 2019.

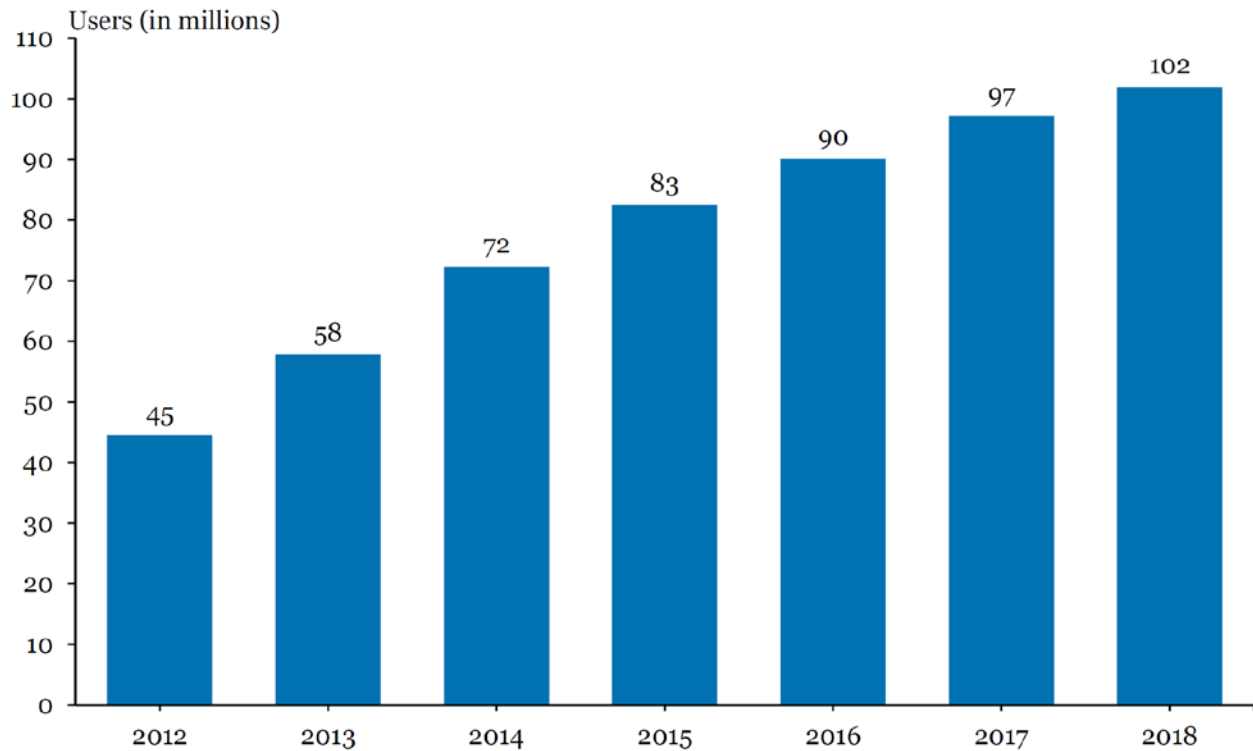


18. Consistent with high sales of iOS devices, the total number of U.S. users of iPhones has been increasing each year. In Exhibit 11, I show the number of iPhone users in the U.S. over time. Between 2012 and 2018, the total number of iPhone users has increased from 44.5 million to 101.9 million.<sup>14</sup>

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<sup>14</sup> eMarketer, “US Smartphone Users and Penetration, by OS,” available at <https://www.emarketer.com/forecasts/584b26021403070290f93a22/5851918b0626310a2c186ae7>, accessed on February 10, 2021.

**FIGURE 11**  
***U.S. iPhone users (2012 – 2018)***



Source: eMarketer, “US Smartphone Users and Penetration, by OS,” available at <https://www.emarketer.com/forecasts/584b26021403070290f93a22/5851918b0626310a2c186ae7>, accessed on February 10, 2021

### ***1.3. Evidence shows that Apple has not exercised market power to reduce quality***

19. The evidence shows that Apple has not exercised market power to reduce quality. Market outcomes demonstrate that quality is both higher on the App Store compared to other app transaction platforms and is increasing for transactions on the App Store. This is especially clear for game app transactions:

- The expansion on the types and quality of apps feasible on iOS devices due to innovation by Apple, including “AAA” videogames that previously could not be played on mobile devices;<sup>15</sup>

<sup>15</sup> Colin Stevens, “Apple Says the New iPad Pro Is as Powerful as an Xbox One S,” *IGN*, November 6, 2018, available at <https://www.ign.com/articles/2018/10/30/apple-says-the-new-ipad-pro-is-as-powerful-as-an-xbox-one-s>, accessed on February 15, 2021 (“In Apple’s media event held this morning, the tech giant claimed that the new iPad Pro can deliver the same graphics performance as an Xbox One S. During this event...Apple said the new iPad Pro can match this graphics performance in a product that’s 94% smaller without the need of an AC cord. It also claimed it’s faster than 92%

- Higher consumer spending for games on iOS devices compared to other devices such as Android devices.<sup>16</sup>

20. First, Apple's constant innovation and improvements in iOS device technology, including improvements in processing speed and graphic processors, have increased the quality of apps, particularly for games, that can be transacted through the App Store.<sup>17</sup> App developers have consequently been able to take advantage of better device performance to offer more technologically sophisticated games for iOS devices. Over time, game developers for example have offered new gaming experiences, building the variety of games available to consumers on smartphones relative to when these devices were first introduced.

21. In 2010, Epic CEO Tim Sweeney claimed that "Over the next decade, iPhone and iPad games will grow from being fun diversions built on shoestring budgets to world-class entertainment experiences," clearly highlighting his understanding that the quality of games available through the App Store (and the quality of the types of game transactions that developers and consumers would make on the App Store) would consistently increase.<sup>18</sup>

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of all portable PCs sold in the last month, and that its graphics performance is 1000x faster than the first generation iPad.").

<sup>16</sup> App Store apps generate more revenue per download than Google Play apps. iOS device users spent \$22.6 billion in the App Store while Android device users spent \$11.8 billion in Google Play in the first half of 2018. In contrast, the number of downloads made through Google Play (76 billion) was 2.5 times larger than that through the Apple App Store (30 billion) in 2018. See Sarah Perez, "App revenue tops \$39 billion in the first half of 2019, up 15% from first half of last year," *Tech Crunch*, July 3, 2019, available at <https://techcrunch.com/2019/07/03/app-revenue-tops-39-billion-in-first-half-of-2019-up-15-from-first-half-of-last-year/>, accessed on February 13, 2021; Mansoor Iqbal, "App Download and Usage Statistics (2020)," *Business of Apps*, October 30, 2020, available at <https://www.businessofapps.com/data/app-statistics/>, accessed on February 13, 2021.

<sup>17</sup> Apple's innovations in device technology include its ARM processors, which have overtaken Intel's mobile processors as the best in their class. See Daniel Eran Dilger, "How Intel Lost the Mobile Chip Business to Apple's Ax ARM Application Processors," *AppleInsider*, January 19, 2015, available at <https://appleinsider.com/articles/15/01/19/how-intel-lost-the-mobile-chip-business-to-apples-ax-arm-application-processors>, accessed on February 8, 2021 ("There is simply no basis for arguing that Intel – the world's most sophisticated processor maker – didn't lose out big to Apple in the relatively new market for mobile processors over the past five years.") Apple's graphical innovations allowed it to run cutting edge mobile games, like the *Infinity Blade* series, which is owned by Epic Games. See John Gaudiosi, "How *Infinity Blade III* Was Built From Scratch to Show Off Your iPhone 5S," *Fast Company*, September 10, 2013, available at <https://www.fastcompany.com/3017153/how-infinity-blade-iii-was-built-from-scratch-to-show-off-your-iphone-5s>, accessed on February 8, 2021 ("That in turn has allowed the team to further close the gap between what can be done on a current-generation console, such as an Xbox 360 or PlayStation 3, and what can be done on an Apple device. 'We're rendering a full depth of field blur and bloom pass, a color adjust pass, a vignette pass, and a distortion pass—and then anti-aliasing the whole thing while maintaining a blazing frame rate,' said Donald Mustard. 'On a device that fits in your pocket.'") Additionally, internal documents at Epic show that *Fortnite*'s performance on iOS was superior to its performance on Android. See Epic Games presentation, "iOS + Android Go to Market Plan," EPIC 00018328 – 362 at EPIC 00018345 ("Android performance is very poor compared to iOS. Out of memory on 2GB devices (mostly Android).")

<sup>18</sup> Email from Andy Hess to Erik Lammerding et al., "Fwd: The Platform Purification Directive :-)," April 12, 2010, APL\_APPSTORE\_00217928 – 30 at APL\_APPSTORE\_00217929.



22. This improvement in the gaming experience on iOS mobile devices is reflected by the creation of games for iOS devices that previously only would have been available on consoles and PCs.<sup>19</sup> The expansion did not come at the cost of variety: while newer games (like Fortnite, PUBG, or Call of Duty Mobile) from well-established developers grew, other types of games continue to be popular in the App Store. The top games on the App Store often contain a variety of game genres and types.<sup>20</sup> For instance, on February 14, 2021, the top 15 paid iPhone apps in the App Store included a content creation game (Minecraft), a tower defense game (Bloons TD 6), a group participation game (Heads Up!), and a board-game adaptation (Monopoly), a resource management simulator (Plague Inc.).<sup>21</sup>

23. Finally, studies that compare revenue across all apps on the App Store to Google Play tend to show that the App Store generates higher revenues per app download, highlighting the higher quality on the App Store for developers and consumers.<sup>22</sup> Overall, the evidence shows that Apple has not exercised market power to reduce quality, and instead the App Store has increased quality over time and offers higher quality relative to other game transaction platforms. Since prices for transactions are essentially the same across these two platforms, this indicates that quality adjusted prices are lower on the App Store than Google Play.

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<sup>19</sup> For example, many games that were previously available only on consoles or PCs now have mobile versions, such as Activision's Call of Duty, Electronic Arts' sports games (such as FIFA Soccer and Madden Football), and more. Other games, previously only available on mobile devices in smaller and limited versions, have been upgraded to achieve near parity with consoles and PC versions: For example, Minecraft has been updated to the "Bedrock Edition," a version of Minecraft that supports cross-play across PC, PS4, Nintendo Switch, Xbox One, and mobile. See Shaun Prescott, "Minecraft: Bedrock Edition has full crossplay support now that PS4 has opted in," *PC Gamer*, December 9, 2019, available at <https://www.pcgamer.com/minecraft-bedrock-edition-has-full-crossplay-support-now-that-ps4-has-opted-in/>, accessed on February 15, 2021.

<sup>20</sup> For a list of top games in the US by Monthly Active Users, see App Annie, "State of Mobile 2021," available at <https://www.appannie.com/en/go/state-of-mobile-2021/>, accessed on February 15, 2021, p. 49.

<sup>21</sup> Historical lists of the top charts in the App Store, for each day, can be accessed at SensorTower, "Top Charts: iPhone - US - Games," available at <https://sensortower.com/ios/rankings/top/iphone/us/games>, accessed on February 15, 2021.

<sup>22</sup> According to data from SensorTower, iOS device users spent \$22.6 billion in the App Store while Android device users spent \$11.8 billion in Google Play in the first half of 2018. In contrast, the number of downloads made through Google Play (76 billion) was 2.5 times larger than that through the Apple App Store (30 billion) in 2018. See Sarah Perez, "App revenue tops \$39 billion in the first half of 2019, up 15% from first half of last year," *Tech Crunch*, July 3, 2019, available at <https://techcrunch.com/2019/07/03/app-revenue-tops-39-billion-in-first-half-of-2019-up-15-from-first-half-of-last-year/>, accessed on February 13, 2021; Mansoor Iqbal, "App Download and Usage Statistics (2020)," *Business of Apps*, October 30, 2020, available at <https://www.businessofapps.com/data/app-statistics/>, accessed on February 13, 2021.

## 1. APPENDIX F: APPLE APP STORE TRANSACTION DATA APPENDIX

1. Below I describe the data provided by Apple and used in the analyses related to App Store transactions.<sup>1</sup>

### *1.1. Apple App Store Transaction Data*

2. The Apple Transaction data are reported at the level of the individual transaction and include app downloads and in-app purchases (including in-app subscriptions) through the App Store. The produced data cover July 10, 2008 through April 25, 2021.<sup>2</sup> [REDACTED]

[REDACTED] I use various variables to identify relevant subsets of the data. Below I detail my filtering methodology performed in the analysis.

3. The Apple Transaction data were produced to me in two separate productions. I limit transactions in the original production dataset to be between July 10, 2008 and September 30, 2019. I limit transactions in the latter production dataset to be between October 1, 2019 and April 25, 2021. I combine these two datasets to use for my analysis.<sup>3</sup>

4. The time of each transaction is identified using [REDACTED]

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<sup>1</sup> Apple produced App Store transaction datasets APL-APPSTORE\_10334265 and APL-APPSTORE\_10750377.

<sup>2</sup> This date range is determined using Pacific Standard Time ("PST").

<sup>3</sup> [REDACTED]

<sup>4</sup> Specifically, I define Q1 as October through December, Q2 as January through March, Q3 as April through June, and Q4 as July through September.

5. To identify if a transaction was an app download or an in-app purchase, I use [REDACTED]

[REDACTED]

6. To identify if an app download transaction or an in-app purchase transaction was classified as free or paid, [REDACTED]

[REDACTED]

7. To identify game transactions, I use [REDACTED]

[REDACTED]

[REDACTED] See my workpapers.

[REDACTED] I treat these as non-subscription in-app purchases.

[REDACTED]

<sup>9</sup> To be consistent with Professor Economides' methodology, I do not exclude these observations to replicate his analysis.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

[REDACTED]  
 [REDACTED]  
 [REDACTED]  
 [REDACTED]  
 [REDACTED]  
 [REDACTED]

\_\_\_\_\_

[REDACTED]

[REDACTED]

[REDACTED]

13

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

## 1. APPENDIX G: APPLE MAC APP STORE DATA APPENDIX

1. Below I describe the data provided by Apple and used in the analyses related to Mac App Store transactions.

### *1.1. Mac App Store Transaction Data*

2. The Mac App Store Transaction data are reported at the level of the individual transaction and include app downloads and in-app purchases (including in-app subscriptions) through the Mac App Store. The produced data cover January 1, 2015 to June 25, 2021.<sup>1</sup> [REDACTED]

[REDACTED] I use various variables to identify relevant subsets of the data. Below I detail my filtering methodology performed in the analysis.

3. The time of each transaction is identified using [REDACTED]

4. To identify if a transaction was an app download or an in-app purchase, I use the [REDACTED]

5. I identify transactions for which Apple is the developer as transactions with [REDACTED]

6. To identify if an app download transaction or an in-app purchase transaction was classified as free or paid, I use the [REDACTED]

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<sup>1</sup> This date range is determined using Pacific Time Zone ("PST").

<sup>2</sup> [REDACTED]

[REDACTED]

7. To identify games transactions, I use [REDACTED]  
[REDACTED]

8. I identify “original transactions” as transactions with [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

9. To calculate revenue earned by developers through initial downloads and in-app purchases in the App Store, I use [REDACTED]  
[REDACTED]

10. To calculate the number of initial download and in-app purchase original transactions, I  
[REDACTED]

11. In all analyses, I exclude transactions where [REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

## 1. APPENDIX H: EPIC DATA APPENDIX

1. Below I describe the data provided by Epic relied upon in my report,<sup>1</sup> my understanding of key variables,<sup>2</sup> and my methodology for filtering out certain irregularities.

### *1.1. Overview*

2. The Epic Monthly User Data are reported at the individual user account, month, and “platform” level and contain over 2.8 billion observations.<sup>3</sup> It is my understanding that the data cover all accounts and “platforms” used to access Fortnite globally from January 2017 to December 2020.<sup>4</sup>

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<sup>1</sup> In response to Apple Request for Production No. 64, on January 22, 2021 Epic produced the dataset EPIC\_04315058 (which contains data for the period January 2017 through December 2020). This dataset has missing observations for the month of January 2019. On February 3, 2021 Epic produced EPIC\_04315058\_1 (which contains data for the month of January 2019 only). In response to clarification questions from Apple’s counsel, on February 11, 2021, Epic communicated that it had inadvertently excluded some data from EPIC\_04315058. In response, it produced EPIC\_04315058\_2 (which contains data for the period January 2017 through December 2020) and EPIC\_04315058\_3 (which contains data for the months of August 2020 and September 2020 only) as replacements for EPIC\_04315058. However, there are several discrepancies between EPIC\_04315058\_2 and EPIC\_04315058. For example, EPIC\_04315058\_2 does not contain data for the month of July 2018 and includes over 8 million observations in February 2020 that do not appear in EPIC\_04315058. Epic provided explanations for these discrepancies on February 13, 2021. On the same day, it produced another dataset, EPIC\_04315058\_4 with July 2018 data that was missing from EPIC\_04315058\_2. On March 14, 2020, Epic communicated that due to an error, certain transactions on iOS using Epic Direct Pay on and after August 13, 2020 were overstated, and produced yet another dataset, EPIC\_04315058\_5 (which contains platform, account\_id, monthly\_mtx\_revenue, and start\_of\_month data for only transactions claimed to be affected from this error). Finally, after additional deficiencies regarding EPIC\_04315058\_5 were pointed out, on March 17, 2020 (the day this supplemental report is being filed), Epic has replaced EPIC\_04315058\_5 with a new data set EPIC\_04315058\_6. Since Epic has to this date not produced a full, comprehensive dataset in one file transfer that has all of the variables for all months, for my report, I rely on a “constructed” dataset comprising i) observations from EPIC\_04315058 for the periods, January 2017 through July 2020 (with the exception of January 2019) and October 2020 through December 2020, ii) observations from EPIC\_04315058\_1 for the month of January 2019 only, iii) observations from EPIC\_04315058\_3 for the months of August 2020 and September 2020 only, and iv) EPIC\_04315058\_5 for the revenue of iOS transactions from August 2020 through December 2020 that are affected from the data error reported on March 14, 2020. All references to the “Epic Monthly User Data” in my report and in this Appendix are to this constructed dataset.

<sup>2</sup> My understanding of the variables in the data is based on definitions provided by Epic.

<sup>3</sup> There are six repeated “account\_id” observations on the account, “platform,” and month level, or less than 0.1% of all observations. These repeated observations all have a “platform” value of “PC” but have disparate values in some other columns. For analyses on the account level, I aggregate these observations.

<sup>4</sup> In particular, I understand that an account appears in the Epic Monthly User Data whenever Fortnite is opened on a device through that account. Having opened Fortnite, the user may not necessarily spend any time actually playing the game or engaging in purchase transactions.



3. The “platform” variable takes on 13 unique values in the data: “ANDROID,”<sup>5</sup> “GOOGLE,”<sup>6</sup> “HONGKONG,”<sup>7</sup> “IOS,” “MICROSOFT,” “OTHER,” “PC,”<sup>8</sup> “PS4,” “PS5,” “SWITAH,” “SWITCH,” “XBOXONE,” and “XSX.” Therefore, in the Epic Monthly User Data, the term “platform” is used for both providers of game transactions and devices.

4. The “account\_id” variable takes on over 382 million distinct values throughout the data. I understand this variable uniquely identifies users that accessed Fortnite. It is further my understanding that if a particular player were to access Fortnite, for example, via iOS and PS4, the same “account\_id” would appear on both these “platforms.” If an “account\_id” appears on two or more different “platform” values within a given timeframe, I consider that “account\_id” to be a user account accessing multiple “platforms” during that period.

5. I use the “timeplayed” variable to identify the amount of time (in hours) at the account, “platform,” and month level.

6. I use the “monthly\_mtx\_revenue” variable to identify Fortnite revenue at the account, “platform,” and month level.<sup>9</sup>

## ***1.2. Universal filters***

7. The “platform” “SWITAH” only appears once throughout the Epic Monthly User Data, in December 2020. I exclude this observation from all of my analyses.

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<sup>5</sup> I understand that “ANDROID” refers to user accounts accessing Fortnite on Android devices where the game was either “sideloaded” or downloaded from the Samsung Galaxy Store, but does not include downloads through Google Play. See EPIC\_03515498\_HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY.xlsx, Tab “notes,” EPIC\_03515498 (“GOOGLE defined as players using google play store...Samsung and Android combined as Android”). On February 13, 2021, Epic stated that between the export of the datasets on January 22, 2021 and February 10, 2021, in the ordinary course of business, Epic made a re-categorization of “GOOGLE” and “ANDROID” users. More specifically, Epic re-categorized Android users that subsequently downloaded Fortnite from Google Play as Google users retroactive back to February 2020.

<sup>6</sup> I understand that “GOOGLE” refers to user accounts accessing Fortnite whereby they downloaded Fortnite through Google Play. See EPIC\_03515498\_HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY.xlsx, Tab “notes,” EPIC\_03515498 (“GOOGLE defined as players using google play store”).

<sup>7</sup> I understand from counsel that “HONGKONG” refers to the PC-based WeGame portal that is used primarily in China.

<sup>8</sup> I understand that “PC” includes both PCs and Macs. See EPIC\_03515498\_HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY.xlsx, Tab “notes,” EPIC\_03515498 (“PC/MAC are PC”).

<sup>9</sup> I understand that “monthly\_mtx\_revenue” corresponds to revenue from MTX items and is reported on the basis of U.S. pricing of an item discounted by 7% to account for variance in worldwide VAT, taxes, and local currency conversions.

8. I note that for each “platform” there are observations in months prior to Fortnite’s initial release on that “platform.” I understand that these observations may correspond to user accounts that were testing the game before its release. I exclude observations for a particular “platform” prior to the release of Fortnite on that “platform”:<sup>10</sup>

- a. Fortnite was released on PC, Mac, PS4, and Xbox One in July 2017.<sup>11</sup> All “PC,” “PS4,” and “XBOXONE” observations before July 2017 are excluded from my analyses.
- b. Fortnite was released on iOS in March 2018.<sup>12</sup> All “IOS” observations before March 2018 are excluded from my analyses.
- c. Fortnite was released on Nintendo Switch in June 2018.<sup>13</sup> All “SWITCH” observations before June 2018 are excluded from my analyses.
- d. Fortnite was released on WeGame (represented by the “platform” “HONGKONG”) in July 2018.<sup>14</sup> All “HONGKONG” observations before July 2018 are excluded from my analyses.
- e. Fortnite was released on Android in August 2018.<sup>15</sup> All “ANDROID” observations before August 2018 are excluded from my analyses.
- f. Fortnite was released on Google Play in April 2020.<sup>16</sup> All “GOOGLE” observations before April 2020 are excluded from my analyses.
- g. Fortnite was released on Xbox XSX in November 2020.<sup>17</sup> All “XSX” observations before November 2020 are excluded from my analyses.

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<sup>10</sup> In all, there are 5.0 million observations, or 0.2% of all observations, that meet these criteria.

<sup>11</sup> Fortnite, “FAQ—General,” September 9, 2017, available at WayBack Machine Internet Archive at <https://web.archive.org/web/20170909115422/https://www.epicgames.com/fortnite/en-US/faq>, accessed on February 15, 2020 (“Q: I pre-ordered Fortnite, but when can I actually start playing? A: Fortnite Early Access will officially release on July 25, 2017.... Q: Which platform(s) can I play Fortnite on? A: PlayStation 4, PlayStation 4 Pro, Xbox One, PC and Mac.”).

<sup>12</sup> Fortnite Mobile Presentation, “Mobile Business Update/Deep Dive,” EPIC\_00126800 – 49 at EPIC\_00126802 (“iOS: Launched March 16, 2018”).

<sup>13</sup> Nintendo, “Fortnite,” available at <https://www.nintendo.com/games/detail/fortnite-switch/>, accessed on February 15, 2021 (“Release date: Jun 12, 2018”).

<sup>14</sup> Gamepedia, “Wegame,” available at <https://fortnite.gamepedia.com/Wegame>, accessed on February 15, 2021 (“To celebrate the Chinese launch of Fortnite on July 24, 2018, Wegame offered players incentives leading up to and through the launch...”).

<sup>15</sup> Fortnite Mobile Presentation, “Mobile Business Update/Deep Dive,” EPIC\_00126800 – 49 at EPIC\_00126802 (“Android: Launched August 13, 2018”).

<sup>16</sup> Epic Memo, “Epic Mobile Status Update,” April 30, 2020, EPIC\_00127553 – 55 at EPIC\_00127553 (“Fortnite was successfully released on Google Play Store on 4/21”).

<sup>17</sup> Epic Games, “Day 1 Ready: Fortnite Arrives Next Week on Xbox Series X|S and PS5,” November 2, 2020, available at <https://www.epicgames.com/fortnite/en-US/news/day-1-ready-fortnite-arrives-next-week-on-xbox-series-x-s-and-ps5>,

- h. Fortnite was released on PS5 in November 2020.<sup>18</sup> All “PS5” observations before November 2020 are excluded from my analyses.

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accessed on February 15, 2021 (“November 10 marks the arrival of not one but *two* brand-new Xbox consoles where you can play Fortnite.”).

<sup>18</sup> Epic Games, “Day 1 Ready: Fortnite Arrives Next Week on Xbox Series X|S and PS5,” November 2, 2020, available at <https://www.epicgames.com/fortnite/en-US/news/day-1-ready-fortnite-arrives-next-week-on-xbox-series-x-s-and-ps5>, accessed on February 15, 2021 (“The PlayStation 5 will be launching November 12 or November 19 depending on your territory. On PS5, Day 1 improvements to Fortnite include...”).

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